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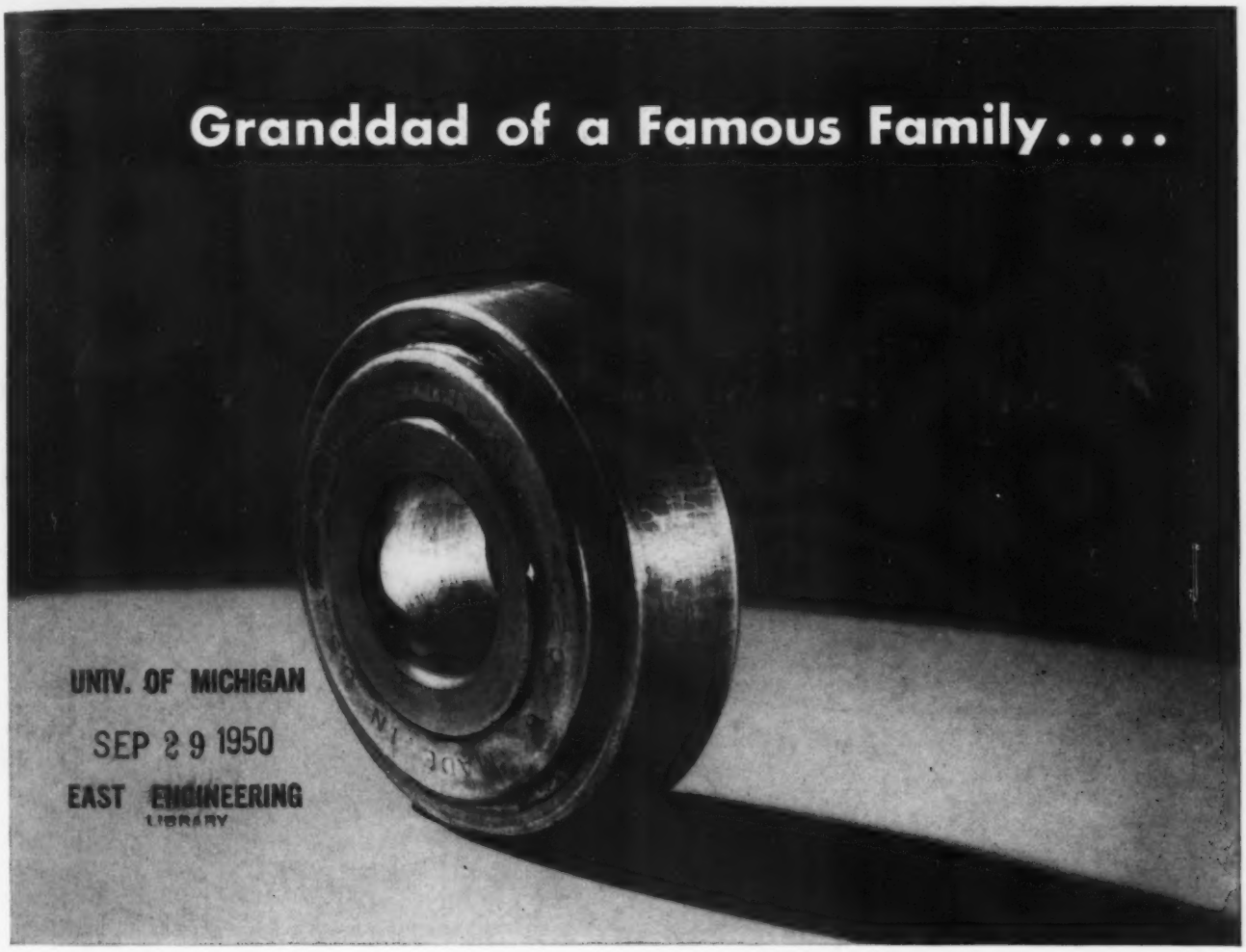
THE IRON AGE

THE NATIONAL METALWORKING WEEKLY September 28, 1950

Granddad of a Famous Family....



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This self-sealed ball bearing, one of the earlier types originated by New Departure, was removed and examined in the twentieth year of its service in a grinder. No appreciable wear had occured and the internal fit-up was still *well within* the tolerances of a new bearing.

For assured performance, for the ability to eliminate periodic adjustments and to reduce lubricating or other maintenance to the simplest possible terms, the ball bearing is *outstanding*.

It was full knowledge of the distinctive advantages of the ball bearing that led New Departure to pioneer and develop the self-sealed bearing, including many lubricated-for-life types, some of which are illustrated at each side.

This hard worked "Granddaddy", progenitor of a famous family, thus started a trend that has required New Departure to produce more than 159 million self-sealed ball bearings to date.

NEW DEPARTURE BALL BEARINGS

NEW DEPARTURE • Division of GENERAL MOTORS CORPORATION • BRISTOL, CONNECTICUT • BRANCHES IN ALL PRINCIPAL CITIES

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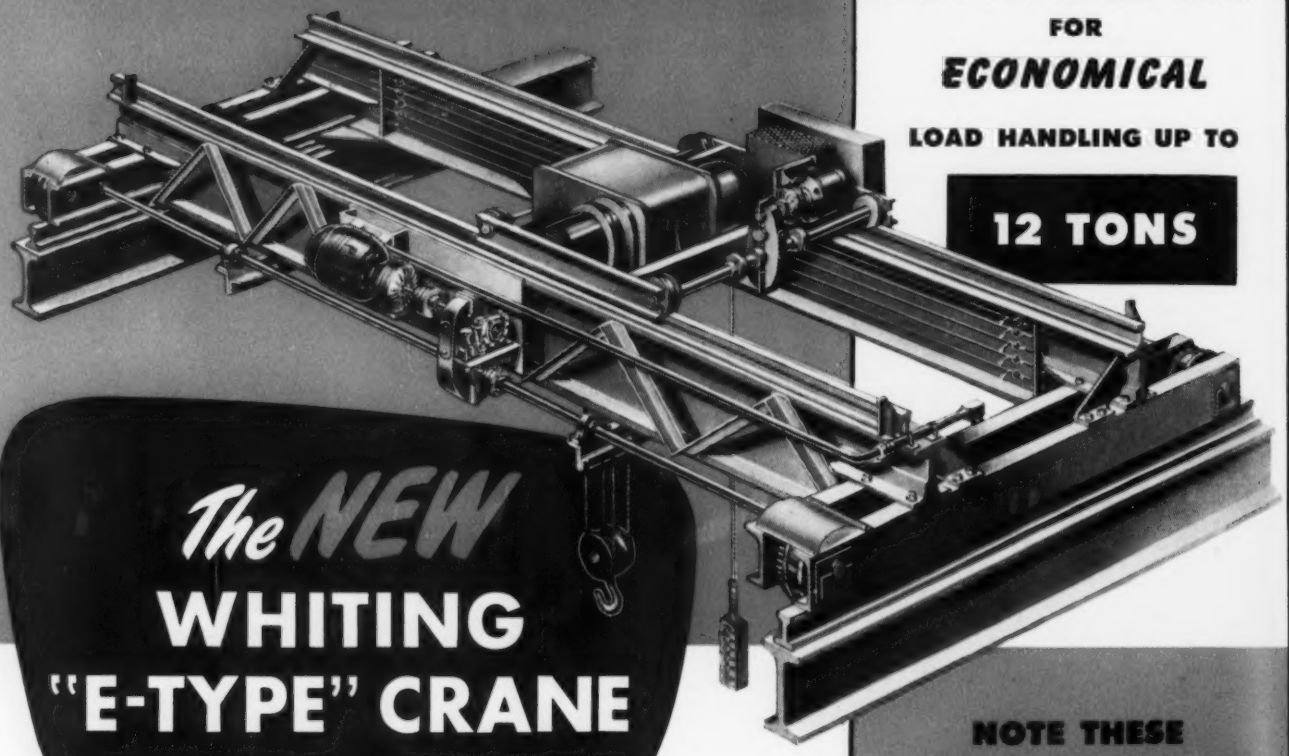
For Intermittent Duty

BUILT FROM STOCK PARTS FOR *ECONOMICAL* LOAD HANDLING UP TO

12 TONS



The NEW WHITING "E-TYPE" CRANE

Here is a crane that makes possible lower-cost materials handling in intermittent-duty applications. The new Whiting "E-Type" Crane costs substantially less than conventional units, because it is made from stock parts which can be built in quantity and assembled without special engineering. Yet, it is built with the same care and precision as the heavy-duty, custom-engineered Whiting Cranes, and has many of their quality features.

Whiting "E-Type" Cranes are recommended for places where lifting is intermittent, and where high-speed lifting and racking are not essential. It is built in capacities up to 12 tons and in spans from 20 to 60 feet, with either floor or cab control.

Bulletin 300-75 describes this unit completely. Write for your copy.

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15601 Lathrop Avenue, Harvey, Illinois

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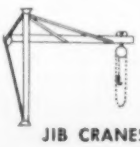
Higher Lift provided by the low headroom hoist. Makes more overhead space available for stacking and storage.

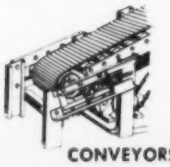
WHITING OVERHEAD TRAVELING CRANES

HOISTS



JIB CRANES

"TRAMBEAM" MONORAIL SYSTEMS



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Also: Foundry Equipment • Railroad Equipment • Metal-Working Machinery • Swenson Evaporators and Spray Dryers

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Bethanized wire may be the answer to one of your wire problems . . . whether you need hard- or soft-temper wire, standard or extra-heavy coating weights. We suggest you get complete details from one of our wire specialists. The nearest Bethlehem sales office will give your request prompt attention.

SOME TYPICAL USES OF BETHANIZED WIRE:

Coil springs
Telephone wire — Barbed wire
Solid clothes line
Twisted wire brushes
Coat hanger hooks
Wheel spokes
Cotter pins — Chain-link fence
Core for aluminum conductor (A.C.S.R.)
Helical springs
Bottle-crate dividers
Conveyor-belt fabrics — Wire rope
Fine wire items
Pump chain — Baskets
Snow fence — Bookbinding
Welded mesh — Flyscreens

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THE IRON AGE

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September 28, 1950 • • • Vol. 166, No. 13

Special Article

Two year trial proves that better cores can be produced at lower costs by electronic baking. Savings come from use of synthetic binders, faster baking.—p. 67.

Issue Highlights

Machining tests at speeds to 1200 sfpm reveal critical information on tool shape, chip formation and coolants. Cutting wedge formation influences tool life.—p. 70.

Stainless brazed joints for gas turbine service must not fail at 2000°F. These joints can be made with dry H_2 atmosphere, special methods and a new alloy.—p. 74.

Stress relief of 347 stainless depends more on temperature than time. From 932° to 1652°F, relief is same with material stressed to 39 or 75 pct of yield strength.—p. 78.

Pipelines planned or under construction will stretch 25,000 miles and need about 6 million tons of steel. Most are for natural gas.—p. 89.

A fatality involving an overloaded steel-hauling truck may force a showdown on Pennsylvania weight law enforcement. Truckers may snub Pennsylvania steel business.—p. 91.

Government-protected steel industries of South America are expanding. They are hampered by high costs but now find the opportune time to grow.—p. 92.

Pressure for higher wages has caught up with the steel industry. Steel companies are expected to get together with the union for wage rise conferences.—p. 96.

Coming Next Week

New machinability determination method uses a graphical plot of microscopic tool wear measurements. It is accurate and faster than conventional tests.

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building industry uses

Cincinnati Press Brakes for multiple bends

Cincinnati Press Brakes are forming multiple bends in one hit on this aluminum siding—a high production item.

Economies—through speed, accuracy of performance and minimum handling—are giving low cost per piece.

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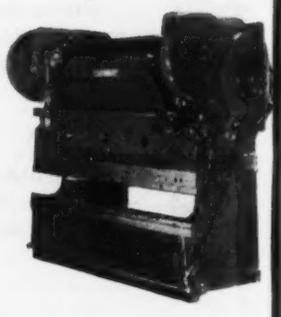
The unusual accuracy and great versatility of Cincinnati Press Brakes make them very profitable both for this production job and for jobbing work. Cincinnati Press Brakes produce a quality product at a low cost. They are a profitable investment.



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Editorial

INDUSTRY VIEWPOINTS

It Takes Steel To Make Steel

WE are about to go into allocations and priorities. It has taken a long time to get around to this—much too long. While the bickering has been going on, metal markets have been hectic, nerves have snapped and a steel sales manager's life isn't worth peanuts.

Maybe we will muddle along and really not run into any serious trouble. But this will be because we are not in an all-out war or all-out mobilization. Even with a limited mobilization of industry, the setup now envisioned, with various cabinet officers getting their two-cents-worth in, we will probably be in for the biggest year of red tape and lost motion that we have seen since the beginning of World War II.

At that time the steel industry was starting a gigantic expansion program. It was being needled by the government to get going on more capacity. It tried to get going but what happened?

Priorities were set up for almost everything except steel to make more steel. Tempers flared, accusations were made. Because no proper provision had been made, steel capacity expansion was completed much later than if allocations had been properly given to those firms who had orders for steel mill equipment.

Right now we are about to repeat all the past blunders. The steel industry is expanding now and it hopes and expects to keep up this expansion. Steel people fortunately have beaten Washington steel "experts" to the punch and have already embarked on an important expansion. Soon there will be green lights, rights of way and what have you for military orders, for indirect defense items and for help to Atlantic Pact countries.

But will there be a special help for those companies—large and small—who are trying to make the parts and equipment that are necessary to supply steel firms with more capacity? We hope there will be. Up-to-the-minute reports from the field show that many firms are having a tough time getting plates and other items needed to fulfill orders for more steel capacity. Some of these firms are struggling along under so-called quotas from steel firms based on their past purchases.

That will not be enough to get the job done quickly. In years to come we are going to need the steel capacity which the industry is trying to complete. Let the steel firms and the firms who are supplying the material and equipment raise their voices now. Later will be too late. Special aid should be considered by the government for steel expansion plans.

Tom C. Campbell

Editor

News about steel

FROM U·S·STEEL SUPPLY

EVENTS are changing so rapidly today that it is difficult to predict what lies ahead for the steel industry and its customers. However, we are in constant touch with Washington and our mill sources, and we will do our best to keep you advised about the steel situation as it affects you.

The latest news about the availability of steel in various sizes, forms and specifications, about acceptable substitutes and delivery dates . . . this type of information will always be as close to you as your telephone. We invite you to consider your U. S. Steel Supply representative as your Steel Service man who will give you up-to-the-minute news about the steel on which your business depends, and do his best to help you locate a supply.

And, of course, it goes without saying—we shall continue to give you the best possible steel supply service in the industry. Although some items are in short supply, our diversified stocks in 14 warehouses still add up to a lot of steel. Perhaps they contain exactly what you want. It will pay to check first with U. S. Steel Supply when you need steel.

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WHEN YOU DEAL WITH US, YOU GET Service Plus!

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UNITED STATES STEEL

NEWSFRONT

NEWS, METHODS AND PRODUCT FORECAST

► Steelworkers are apparently slow to take advantage of the retirement pensions won in last fall's strike. At one company, little more than a third of the eligible workers have retired to date. Inflation and the prospect of a wage increase are factors working against retirement at 65.

► Use of ordinary enameled wire in place of coaxial cables is a good future possibility for transmission of ultra high frequency signals. This proposed application uses the principle that non-radiating cylindrical surface waves can be guided by a conductor coated with a dielectric layer.

► Specific applications for titanium metal products can be counted on one's fingers even though the broad applications are potentially great. One company that has successfully rolled "commercial grade" titanium sheets has no idea where it can sell them. Right now, titanium metal products are generally being sold at a loss. The price, when it is finally deptermined and posted, may jar some would-be users.

► Stainless steel for television tubes accounted for at least one third of the total tonnage rolled on the sheet mills of one plant of a leading specialty steel producer in recent weeks.

► Manufacturers of kitchen cabinets, hard pressed by the shortage of cold-rolled steel sheets, are experimenting with plastic substitutes. Those who get in first may get a jump on the field--but the last war showed that every time a "good" substitute was found so many people turned to it that it too became scarce.

► Producers of stainless and alloy steels are privately burned up at the government's failure to stockpile nickel as it could have last year. In 1949 International Nickel operated at only 90 pct of capacity--which left perhaps 10 pct of its output that could have been stockpiled last year. And the price was 40¢ against the current 48¢ per lb now being paid for putting nickel into the strategic reserve.

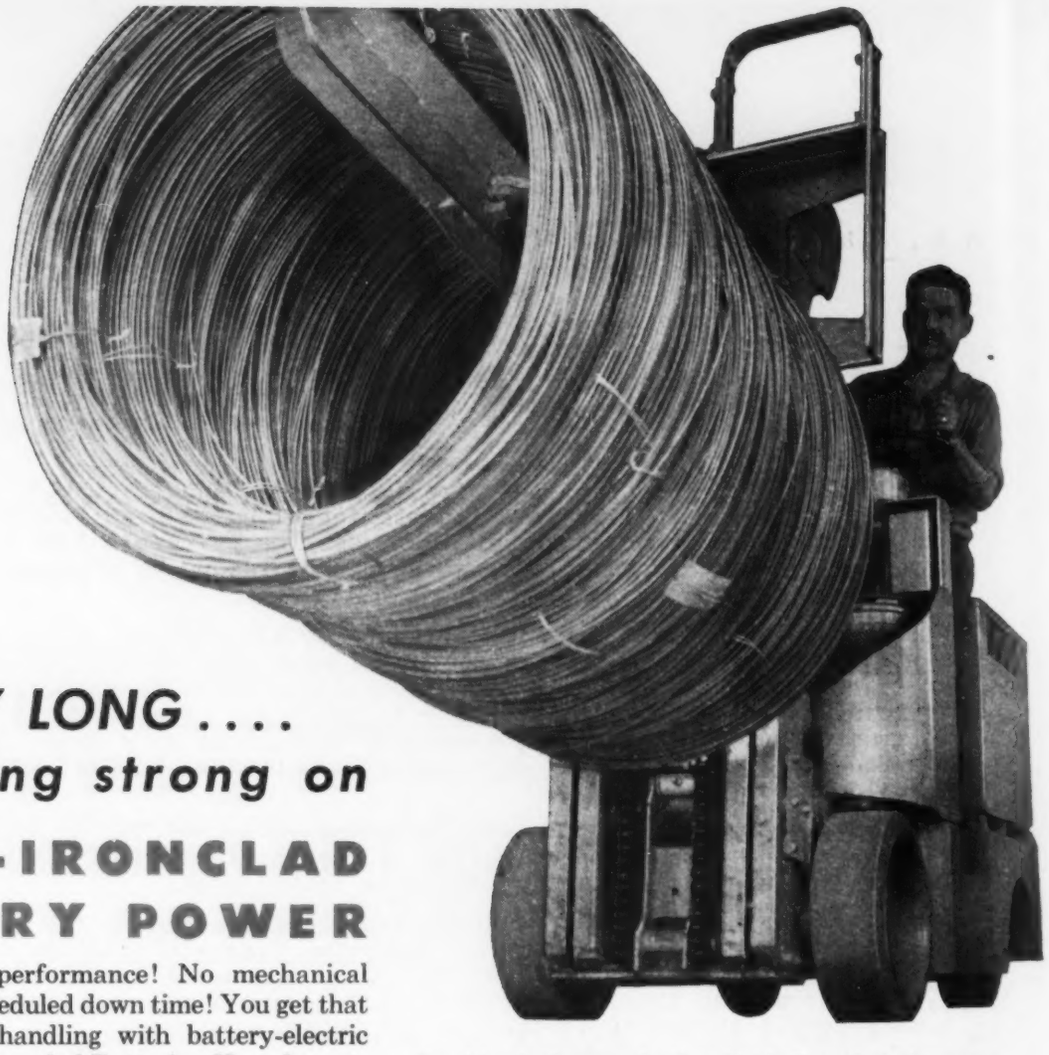
► With ductile vanadium now available, research and development on product use is going on at a rapid rate. It is expected that alloys of vanadium will soon be available. Vanadium chips for remelting cost $30 per lb. Ingots, bars, sheets and foil are also available at higher prices.

► The Defense Dept. ranks research high: Research and development specialists with ranks of captain and lieutenant in Army Organized Reserve units will be ordered to duty in similar posts.

► Memo for companies planning plant protection fencing: Two Navy men on Guam drove from 60 to 150 fence posts in hard coral in 8 hr. They used a homemade rig combining a wagon drill and an air compressor.

► Many companies recognize that statistical quality control is often better than 100 pct inspection in finding "rejects" but usually they abuse the system and get invalid results. Trouble comes in improper sampling which ruins the mathematics on which the system is based.

► A cold-extruded cylinder containing air at high pressure has been developed for one-shot inflation of automobile tires. Cold extrusion has cut the cost to the point where it can be thrown away after use.



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- wide range of sizes for every make of battery-electric truck; compact construction permits standardization.

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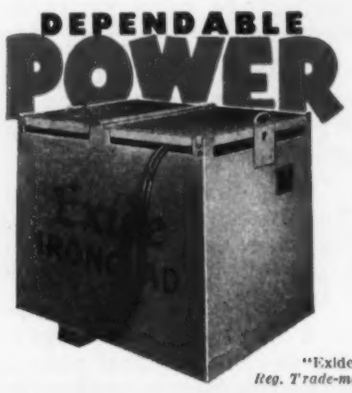

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1888 . . . DEPENDABLE BATTERIES FOR 62 YEARS . . . 1950

Defense Steel Still Muddled

Automakers Losing Inventory

Pig Iron Prices Are Advanced

The Iron Age SUMMARY

IRON AND STEEL INDUSTRY TRENDS

STEEL users looking for some clear cut rules on defense steel are doomed to disappointment for at least several more weeks. Official Washington is moving at a snail's pace in setting up a priority and allocations program. Progress is hampered by a virtual lack of experienced administrators and a fear of stepping on political toes.

Steel producers this week are faced with an impossible task. The order and scheduling picture is compound confusion. War orders are straggling in with no definite tags on them; good customers are being shoved back and other customers are being turned down flat. Steel companies are now just as confused as their customers.

Deliveries Falling Behind

Meanwhile delivery promises are being pushed back further every week. Right now even the automakers appear to be losing inventory and it is only a question of time before they are on a more or less hand-to-mouth basis. And that basis will not support current peak production. August deliveries to the automobile companies were about 25 pct below promises and September has been worse.

A threatened wire shortage gave automakers and other steel wire users the jitters this week. Four wire-producing plants have been hit by wildcat strikes recently, and early this week two were down flat and a third was partially down. To show how poor their inventory position is, Detroit reports that another 2 weeks of wildcats in wire will probably be the blow that breaks its current production peak.

These strikes are not necessarily indications of what will happen in steelworkers unions throughout the country. Though no grievances have been filed in wire, observers believe the strikes are not entirely based on dissatisfaction with present wage levels. That dissatisfaction does exist, but so far it is not on the scale that caused "trained wildcats" in the auto industry.

Steel operations for the week were still at 100.5 pct of rated capacity, the same level they held last week. Steel output can be advanced a lot with present expansion plans. But industry will not move according to plan until the government works out a program to give a green light for steel capacity expansion.

More Steel Capacity Planned

Recent figures on steel capacity expansion may be too conservative. An IRON AGE survey showed some 4 million tons of new capacity due in by the first of 1952. This was later supplemented by an American Iron and Steel Institute survey showing 6 million tons by the end of 1952. THE IRON AGE has now learned that due to changing world conditions these reports are now on the conservative side. By the end of 1952 the expansion may approach 8 million tons if the steel is available.

By early this week at least eight pig iron producers had advanced their prices, most by $3.00 a ton on all grades. One cold-rolled strip producer advanced extras by $3.00 to $9.00 a ton.

Material Shortages Begin to Hurt

Materials shortages are beginning to be felt in production cutbacks. One stainless steel company interrupted chrome-nickel steelmaking because it used up its September nickel quota. Some automobile bumper manufacturers have cut down on the thickness of chromium. The copper scarcity threatens to hit production of copper coated strip, used in products such as auto gas and oil lines and refrigerators.

While steel scrap buyers have apparently been successful in holding the line on prices during the past few weeks, there is mounting evidence that they may lose their fight before long. Foundry scrap is higher and pressure on the steelmaking grades is stronger than it has been in a long time. Prices on heavy melting steel have already started up in spots.

(Nonferrous summary, p. 116)

STANDARDS and SPECIALS by the Millions

THE FERRY CAP & SET SCREW CO.

2157 SCRANTON ROAD • • • CLEVELAND 13, OHIO

"SHINYHEADS"

America's Best Looking Cap Screw

Made of high carbon steel — AISI C-1038 — to standards for Full Finished hexagon head cap screws — bright finish. Heads machined top and bottom. Hexagon faces clean cut, smooth and true, mirror finish. Tensile strength 95,000-110,000 p.s.i. Carried in stock.

"HI-CARBS"

Heat Treated Black Satin Finish

Made of high carbon steel — AISI C-1038. Furnished with black satin finish due to double heat treatment. Hexagon heads die made, not machined. Points machine turned; flat and chamfered. Tensile strength 130,000-160,000 p.s.i. Carried in stock.

"LO-CARBS"

Made of AISI C-1018 steel — bright finish. For use where heat treatment is not required and where ordinary hexagon heads are satisfactory. Hexagon heads die made to size — not machined. Points machine turned. Tensile strength 75,000-95,000 p.s.i. Carried in stock.

SET SCREWS

Square head and headless — cup point. Case hardened. Expertly made by the pioneers in producing Cup Point Set Screws by the cold upset process. Cup points machine turned. Carried in stock.

FILLISTER CAP SCREWS

Heads completely machined top and bottom. Milled slots — less burrs. Flat and chamfered machined point. Carried in stock.

FLAT HEAD CAP SCREWS

Heads completely machined top and bottom. Milled slots — less burrs. Flat and chamfered machined point. Carried in stock.

"SHINYLAND" STUDS

All studs made steam-tight on tap end unless otherwise specified, with flat and chamfered machined point. Nut end, oval point. Land between threads shiny, bright, mirror finish. Carried in stock.

ADJUSTING SCREWS

Valve tappet adjusting screws — Hexagon head style — to blue print specifications — hexagon head hard; polished if specified — threads soft to close tolerance — points machine turned; flat and chamfered.

CONNECTING ROD BOLTS

Made of alloy steel — heat treated — threads rolled or cut — finished to extremely close thread and body tolerances — body ground where specified. Expertly made by the pioneers in producing connecting rod bolts by the cold upset process.

SPRING BOLTS

Case hardened to proper depth and ground to close tolerances. Thread end annealed. Supplied in various head shapes, with oil holes and grooves of different kinds, and flats accurately milled.

FERRY PATENTED ACORN NUTS

For ornamental purposes. Steel insert — steel covered. Finish: plain, zinc plated, cadmium plated. Size: 9/16", 3/4", 15/16" across the flats.

Tapped 1/4" to 3/4" inclusive. Cross section of Ferry patented acorn nut, showing how steel hexagon nut fits snugly into shell.

Pioneers and Recognized Specialists, Cold Upset Screw Products since 1907

STANDARDS carried by LEADING DISTRIBUTORS

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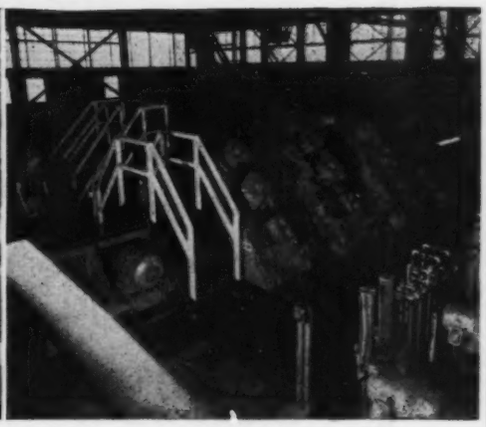
SEND FOR SAMPLES

NATIONAL TUBE'S new continuous "Stretch-Reducing" SEAMLESS PIPE MILLS

designed and built by Aetna-Standard

National Tube and Aetna-Standard specialists have been working together for several years in the development of the world's first continuous seamless pipe mill now in operation at Lorain. A similar mill has been installed at Gary. These mills, based on the stretch-reducing principle, have been hailed as "one of the greatest advances in the steel industry during the past 50 years."

Aetna-Standard has been proud to work with National Tube in this accomplishment. This company builds most of the seamless tube mills in the world for pipe sizes from 2½" to 26".



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Dear Editor

Letters from Readers

For Plain Talk Out West

Sir:

We would appreciate receiving 50 copies of your editorial, Aug. 24 issue of THE IRON AGE, on the subject "We Need More Plain Talk."

We would like to send this editorial to our sales staff in the Western District, as we feel that the remarks of Mr. Campbell, your editor, are very timely.

J. R. HAGERMAN
Sales Mgr., Barrett Div.
Allied Chemical & Dye Corp.
Chicago

Rent It For Less

Sir:

In a recent issue of your good publication on the "Newsfront" page there was an item about a machinery rental plan developed by a distributor and a commercial bank in Philadelphia.

We have just completed negotiations for a plant in the Lancaster, Pa., area and will need a complete line of metal working machinery to get this unit in operation as soon as possible. Could you put us in touch with the proper parties?

F. C. TOUTON
Vice-President
James Mfg. Co.
Fort Atkinson, Wis.

A complete description of the machinery rental plan appeared in the issue of Aug. 31, p. 51. The company which has put this plan into effect is Rentco, Inc., 3818 Chestnut St., Philadelphia 4.—Ed.

More on Spanish Mill

Sir:

I was happy to see that you printed Mr. Morales's letter from Madrid (Dear Editor, Sept. 7 p. 20). He refers to a Spanish Government decree of June 15 giving to the INI (Institute of National Industry) the right to establish a large steel plant (Foreign Commerce Weekly Aug. 14, 1950, p. 21).

Early this year I visited Spain and reported on it (Metal Progress Aug., p. 197). The following facts should be pointed out: (a) Spain can easily use 2 million tons of steel per year. It now produces only one third of that. (b) Spanish engineers consider that all that is made in the U. S. is done only on a large scale; (c) coke, coal, scrap, and power are either poor and/or scarce. (d) Spain, as a result of various reasons—amongst others it's preparedness against communism—does not have much foreign exchange available, and therefore must be self-sufficient in various respects. In addition, it should be noted that Spain is considered a nation with adequate or surplus iron ores.

The proposed 600,000-ton plant is of the order of our plant such as Lukens, Alan Wood, Midvale and Granite City. Spain had a large iron and steel project in the early forties, which was never finished and which was considered too large in certain aspects at the time. In view of the various things mentioned above, I believe that considerable ingenuity and modern technical know-how, and possibly some development work, will be necessary to make this Spanish plant a success, and personal relations should not be forgotten. If our concerns are interested, it should be a good challenge to our engineers.

Two years ago a party in Spain approached several large American iron and steel producers trying to get them interested in the establishment of an integrated steel plant in Spain. It was considered that a project handled by private interests should be to the mutual advantage of Spain and the U. S. Remember communism in Europe.

F. R. MORRAL
Syracuse University
Syracuse, N. Y.

Export Business

Sir:

In the issue of June 2, 1949, p. 72, an article appeared under the heading "Machining Malleable Iron," showing pictures, Fig. 8 and 9, of automatic and semi-automatic threading machines for pipe fittings. We are subscribers to your magazine, and wonder whether you would do us the great favor of effecting contact with the manufacturers of the above mentioned machines preparatory to purchasing negotiations.

IVAR MATHISEN
A/A Sandnes Aducerverk
Sandnes, Norway

For more information about the machines in these illustrations, contact W. A. Kennedy, The Grinnell Co., Providence, R. I. —Ed.

Rust Stopper

Sir:

We are designing a new literature piece covering a new rust-preventive coating we are about to market. However, we require a photograph showing steel stock or parts being stored out in an open stock yard. Do you happen to have a photograph of this type in your files that we might use?

V. W. SMITH
G. W. Smith & Sons, Inc.
Dayton

A photo showing a good bit of steel in outdoor storage has been sent.—Ed.

Eaton Permanent Mold Gray Iron Castings

for HIGH PRESSURE CONTROL MECHANISMS

- Free machinability
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- Freedom from leakage under pressure
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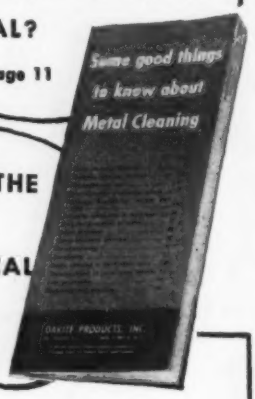
WHAT'S THE FASTEST WAY TO CLEAN METAL?
See page 11

WHAT'S THE MOST ECONOMICAL WAY?
See page 9



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answers many questions that mean better production for you, more money in your pocket. Check this *table of contents* for cleaning jobs you'd like to improve:

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- ☐ Pre-paint treatment in tanks and by hand
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- ☐ Steam-detergent cleaning
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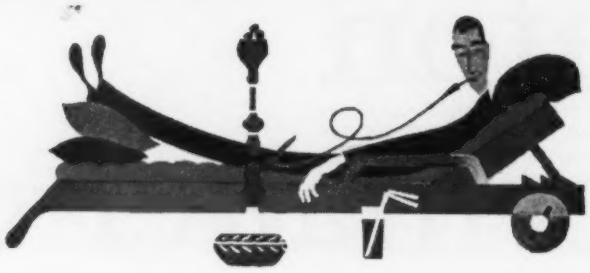


Fatigue Cracks

By CHARLES T. POST

Termites at Work

Last Apr. 20 Tom Campbell wrote an editorial with a distinctly Maeterlinckian tone describing the ways and wiles of termites. He emphasized their ability to completely undermine a structure without any apparent surface indications, then drew a sharp comparison with Communist tactics.

Never having thought of Campbell as a denizen of the Museum of Natural History, his knowledge of termites was surprising until he confessed that he had shucked out several hundred dollars to do battle with the nasty little pseudoants in the foundations of his home. At that point he placed learning more about them under the heading of "essential business."

After the usual flurry of interest, the editorial was forgotten until last week, when a firm asked permission to reprint it for distribution to the sales force. The firm was the E. L. Bruce Co. of Memphis, the same one which had billed Campbell for getting the termites out of his foundations.

Speakers Tabled

Word from the brains department is that the business paper editors' conference held by Westinghouse Electric Corp. was one of the best they had ever attended. After a comprehensive indoctrination in the Westinghouse plants, the editors filed into the dining room for a final banquet. A big speakers' table was set up, but no seats having been assigned, everyone shunned it. No one being at the speakers' table, there could be no speeches. If you see a lot of kind words about Westinghouse in the business press, you'll know why.

Aptronym

Apparently heeding the old adage that "if the shoe fits, put it on," the Canadian Association of Chiropodists has elected as executive secretary, Dr. Norman D. Foote of Toronto.

Time To Read

Seattle police are looking for a salesman accused of selling an Army private a 500-yr subscription to a magazine for $50. This indicates not only that the increasing longevity shown by mortality tables has raised everyone's expectations of living to a ripe old age, but that the military man is fairly confident of the future. Of course, the private never received the first issue.

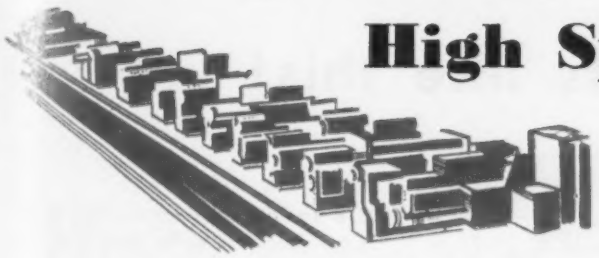
Puzzlers

We never could figure out why so many incorrect answers came in on the problem of the fly walking across the room until we saw a work sheet submitted by "R. J. E." of International Harvester showing 16 possible routes of which 6 were different, 6 repeat, and 4 imaginary. Barring the imaginary routes, which even an imaginary fly couldn't travel, there was only one short route (40 ft), which R. J. E. put his finger on. Incidentally, Oscar Quist and H. M. Barnes came up with the answer to the drill-bar problem (Aug. 24).

Reader Barnes asks this one: "How about the room 12 ft by 14 ft with a 1 ft wide board extending diagonally from corner to corner. The problem is to determine the longest board that can be placed flat on the floor if the ends of the board are cut square." It's harder than it looks.

Last week's answer on the balls and walls, per A. C. Wilcox: $4+2\sqrt{3}$, or approximately 7.464 ft.

MACHINE TOOL High Spots



Sales Inquiries and Production

By W. A. LLOYD

Plate, Pig Iron Short — Shortages of manpower and materials, particularly plates and pig iron, were threatening production schedules in some segments of the machine tool industry this week. Press builders have been scrambling for plate tonnage for the past 3 months, and the situation shows no signs of improvement at the moment.

A number of companies operating their own foundries have been feeling the pinch of the merchant iron shortage for the past 2 months. Scrap prices have advanced on all foundry grades and last week several major producers of merchant iron raised prices about $3 a ton.

Companies buying their castings on the open market will find these higher costs showing up in castings prices, all of which does not weaken the case for escalator clauses.

Business Still Booms — Despite reports that new order volume has been tapering off at some companies during the past 10 days, business is still booming for the bulk of the industry.

National Machine Tool Builders Assn. index of August orders rose to a preliminary 307.3, a new postwar peak and the highest since March, 1943. The July index was 253.1. Preliminary index of foreign orders in August rose to 34.1 compared with an index of 22.3 for the previous month.

Shipments Jump—Index of shipments jumped to 93.7, highest since Dec. 1948, compared with 68.3 for July. As a result of the increase in shipments, the ratio of unfilled orders dropped to 8.9 to 1 compared with 9.2 to 1 in July.

A company check on primary sources of new business indicates the small shops are responsible for a big chunk. One company spokesman reported orders for more than 100 machines, all from small shops or companies, during the past 45 days.

Machine Affiliates Meet—In Cincinnati, first meeting of directors of Machine Affiliates Trading Corp. was held last week at R. K. LeBlond Machine Tool Co. Melvin Stone of New York, Matcorp president, said the group has a backlog of orders "well over $150,000." He criticized government policy that provides U. S. financing for European firms which in turn provide competition for U. S. companies in South America. Matcorp was formed last May to handle credit facilities for 16 companies in South America.

Matcorp's $250,000 capitalization is now complete and Central Trust Co. has been named official agent. Edward G. Schultz, treasurer of the R. K. Leblond Machine Tool Co., is secretary and treasurer and Neil C. Schauer, sales manager of Cincinnati Bickford Tool Co., is vice-president and assistant treasurer.

Will Maintain Tank Plant—In Cleveland, government plans to maintain the tank plant operated by Cadillac Motor Car Div. of General Motors Corp. as a "permanent force in being" were reported. The plant had been placed in the category of a Class 2 industrial installation, under direct jurisdiction of Maj. Gen. E. L. Ford, Chief of Army Ordnance in Washington.

Behind the move lies the need for establishment of manufacturing facilities that can get into production at a moment's notice. Urgency of such an arrangement has been emphasized by the poor state of much of the machine tool reserves now held by the government.

Machines Need Repair — It is understood the tank plant requires about 4000 tools to start, and only a small part of the stored war reserve machinery is suitable. Parts are missing, machines need repair or are obsolescent.

At a procurement "clinic" held here last week, about 40 General Motors division heads were shown a disassembled tank, comprising some 12,000 parts, excluding the engine and special equipment, including radio and fire control apparatus.

Convention—The National Tool & Die Manufacturers Assn. will hold its fifth annual convention at the Hotel Statler Oct. 29 through Nov. 1 in Cleveland.

Effective mobilization for defense production by the 450 members will be the theme of the meeting. Reports on the mobilization planning survey now being conducted will be heard.

Association officers include Centre W. Holmberg, president, Herbert F. Jahn, vice-president, and George S. Eaton, executive secretary.

Use tested Amerhead Heading Wire

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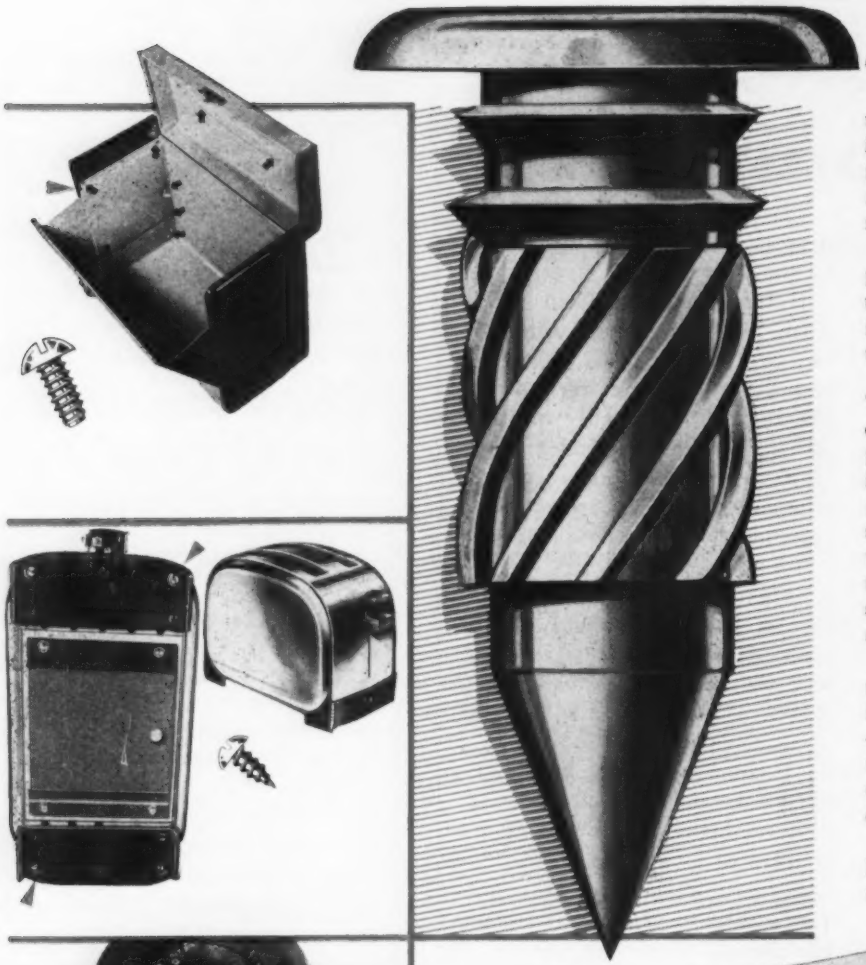


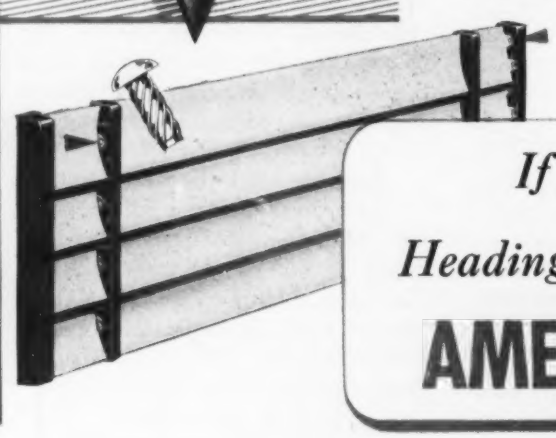
THE unusual drive-screw above is a real money-saver for many manufacturers. Driven with a hammer, it instantly and *permanently* fastens fabric, leather or cardboard to sheet metal. Assembly costs drop like a rock.

But the drive-screw will not work properly unless it is made with the utmost care — precision manufacturing methods . . . rigid inspections . . . the very finest Heading Wire.

Amerhead Heading Wire was "made-to-order" for this job. It has a combination of physical and chemical properties that's hard to beat. And, in every stage of production, it is subjected to some of the most rigid inspections known to the industry. So we're certain, when we ship your wire, that you're getting exactly what you specified with regard to strength, hardness and workability.

This rigid inspection means something else to you, too: Complete uniformity. So that when you reorder —in a month or in a year—you'll get the *same* wire, with the *same* properties that you got in *every* previous order.

For more information about this high-quality heading wire, get in touch with our nearest field office.



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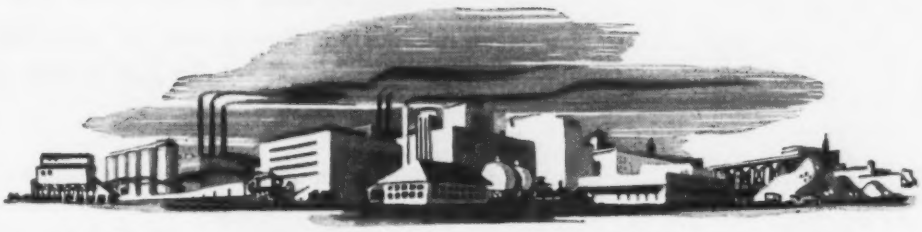

This is the actual experience of a Harrisburg Pa. firm* that stopped the kind of profit loss which may be hidden in YOUR plant, too!

In a material handling survey, lubricating of machines came in for its share of attention. The head of production called in an Alemite Lubrication Engineer to help him spot possible ways to cut costs. They found a way to lubricate machines that added 30 minutes more production daily. The total investment in Alemite equipment was $391.25! The saving in production time—in addition to a 60% reduction in lubricant used—comes to $2160 a year!

**Name on request*

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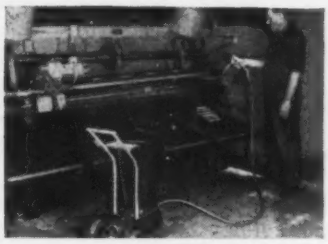

3. ***In Applying Lubricants . . .*** by saving up to 23.9 man hours for every 100 pounds of lubricant applied to bearings.

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PUBLICATIONS

New publications that describe money saving equipment and services are available free and without obligation. Copies can be obtained by filling in the attached card and mailing it.

Facts Book

Designed as an aid to better understanding for anyone considering the use of nonferrous castings, the new Eclipse-Pioneer "Book of Facts" describes this company's services and facilities as specialists in nonferrous sand castings. Facts and figures pertinent to aluminum and magnesium casting alloys are presented, design of aluminum and magnesium castings is discussed, and information is given on finishing and machining these materials. *Eclipse-Pioneer Div., Bendix Aviation Corp.*

For free copy insert No. 1 on postcard.

Better Bulk Handling

Webb Towveyor floor type tow conveyers are described in a new 4-p. bulletin. The equipment shown consists of a continuous chain conveyer with the chain running in a steel slot below the floor. The simple towing pin device is bolted to the end of the standard 4-wheel truck or trailer; standard 2-wheel trucks may be used with a dolly. As shown in the folder, trucks may be wheeled off the conveyer anywhere for loading or unloading, and reattached by the simple expedient of dropping the pin. *Jervis B. Webb Co.*

For free copy insert No. 2 on postcard.

Three-Way Cleaner

Oakite Compound No. 33, a metal cleaner that does three jobs in one operation, is covered in a new folder. The bulletin tells how, whether applied in tanks or by hand, the compound removes oil, removes rust, and prepares the surface for painting, all in one operation. Physical characteristics of the product are presented, along with testimonials showing the warm approval of metal processors everywhere. *Oakite Products, Inc.*

For free copy insert No. 3 on postcard.

Improving by Forging

A new 44-p. catalog presents informative data on shaping and improving metals by forging. Pictures of methods used, including designing, die sinking, drop forging, heat treating, and inspection for quality control are shown. The booklet also contains tables of the characteristics and applications of commercial forging metals, and standard tolerances for drop forgings. *Steel Improvement & Forge Co.*

For free copy insert No. 4 on postcard.

Rustproofing Process

A new rustproofing process which provides a heavy zinc phosphate coating of high corrosion resistance on iron and steel parts is described in a new folder. The process, called Perm-Cote, features a balanced solution which reduces sludging, giving low coating cost and pleasing appearance. *Detrex Corp.*

For free copy insert No. 5 on postcard.

Industrial Temp Control

The basic principles of industrial temperature control are set down in usable fashion in a new 24-p. manual. Prepared primarily for process engineers, plant managers, design and heating engineers, the study defines the different types of control systems and distinguishes between them so that the engineer can logically select the particular type most appropriate to his situation. Typical circuits and piping arrangement, and the matter of the ranges and calibrations of scales and dials, are dealt with diagrammatically. *Partlow Corp.*

For free copy insert No. 6 on postcard.

Close-Coupled Pump

Design and construction of a close-coupled pump and motor, the Electrifugal, are described in a new 6-p. bulletin. The pump shown has a single shaft mounted in an exclusive unit-cast frame to assure perfect and permanent alignment. Available with drip-proof, splash-proof, totally-enclosed, fan-cooled or explosion-proof motor enclosures, the pumps vary in ratings from 10 to 500 gpm at heads to 220 ft, with motors rated from ¾ to 10 hp. *Allis-Chalmers Mfg. Co.*

For free copy insert No. 7 on postcard.

Acrylic Polymers

A series of acrylic polymers are described in a new technical data bulletin outlining the properties and discussing their compatibility with surface active agents and colloids. The modified sodium polyacrylates are water-soluble anionic colloids and are available as clear

Turn to Page 107

7,000 POUND CASTING OF "18-8" STAINLESS STEEL. Produced by The Ohio Steel Foundry Company at its Lima, Ohio plant, this turbine runner meets A.S.T.M. A-198 Grade A Specification.

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HERE'S a turbine runner cast in 18-8 chromium-nickel stainless steel to secure the utmost in resistance to corrosion, erosion and cavitation...

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We invite your inquiries on the use of cast or wrought stainless alloy steels containing nickel. Send us details of your problems for our suggestions.

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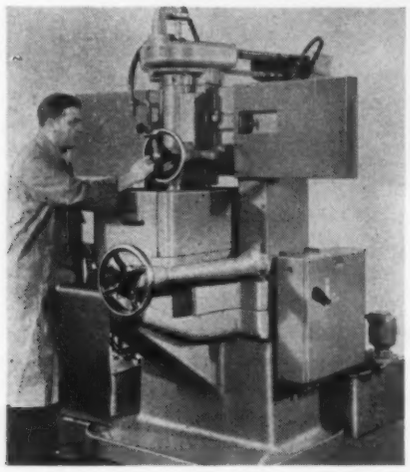
and ac ammeters, voltmeters, wattmeters, frequency meters, power-factor meters and synchroscopes. *General Electric Co.*

For more data insert No. 20 on postcard, p. 37.

Die Grinders

Designed for surfacing high speed steel and carbide dies.

A new vertical die and surface grinder designed for facing new die blocks, reconditioning dulled impression edges, preparing worn dies for resinking and for regular surface grinding is built in two sizes with table capacities 16x24 in. and 36x42 in. Operating like a vertical profiler, it finishes flats around irregular reliefs, and is suitable for precision step grinding. It is reported that 1½ to 2-microinch surface finishes are produced without need for subsequent lapping or polishing and with



minimum breaking-down of cutting edges. The 16x24-in. die and surface grinder is equipped with three spindle speed changes that adapt the machine for grinding carbide or tough die steels. Speeds are suited for 3 and 5-in. diam grit cup wheels and diamond cup wheels. The table hydraulic drive has a variable feed range from 1 to 20 fpm. A 10-in. ring wheel is used on the 36x42-in. machine with a spindle speed of 1750 rpm. Table hydraulic power feeds range from 1 to 40 fpm. *Pratt & Whitney, Div. Niles-Bement-Pond Co.*

For more data insert No. 21 on postcard, p. 37.

Mica Undercutter

Cuts mica slots on all types of armatures for electric motors.

A new machine, known as the Electro-Magna-Cut mica undercutter, embodies a new principle for rapid precise indexing. The indexing system is electro-magnetically controlled. Machining can be performed radially or across the circumference for a wide variety of operations with speed and precision. Also featured in the machine are completely automatic

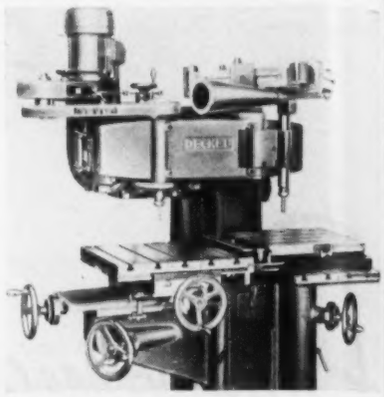
loading, feeding, positioning and unloading mechanisms operated by synchronized electric magnetic and pneumatic systems. As soon as the pre-determined number of slots has been cut in each armature, it is automatically unloaded and loaded again as the conveyer positions the next piece. *Joy Tool & Die Co.*

For more data insert No. 22 on postcard, p. 37.

Copy-Milling Machine

For making small and medium dies and molds weighing up to 1100 lb.

Molds and dies are made on the new Friedrich Deckel Model KF 1 universal copy-milling machine with great economy it is claimed when using various attachments made for the machine. When copy-milling at a 1:1 ratio, the pantograph serves only as a guide for the tracing stylus and cutter head spindle. A parallel guiding device moves longitudinally, transversely and vertically; and its weight is counter balanced by an adjustable spring. Cutter spindle speeds are stepless between 300 and 9500 rpm. An optical contracting device, to indicate when stylus touches master, is used only during rough milling operations. A circular milling attachment is used for milling radii



and for making concave and convex patterns of geometrical circular forms. Rough and finish milling in longitudinal or transverse lines is possible with a line milling device. Power is supplied by a two-speed motor for any standard voltage. *Cosa Corp.*

For more data insert No. 23 on postcard, p. 37.

Improved Iron Hand

Larger models facilitate handling and turning over large stampings.

Longer stroke and a longer reach into the die have been provided by a new jaw assembly, extending the application of the iron hand for unloading stamping presses. The new assembly is lighter, with 30 pct fewer moving parts. A new cam assembly minimizes vibration and provides a rigid mounting. Cycle time has been increased 20 pct by enlarging the airline connections. Strokes per minute range from 12 to 20. A new jaw blade chisels the stamping out of the die and lifts it vertically over the gage pins, eliminating the need to use lifters in the die. Larger models have power cylinder strokes of 20 and 24 in. *Sahlin Engineering Co.*

For more data insert No. 24 on postcard, p. 37.

Size Control Gage

Takes guess out of honing ID's; tells how much stock is left.

The size control gage is a precision indicator gage that is actuated by the stone feed-up dial on

Turn to Page 108

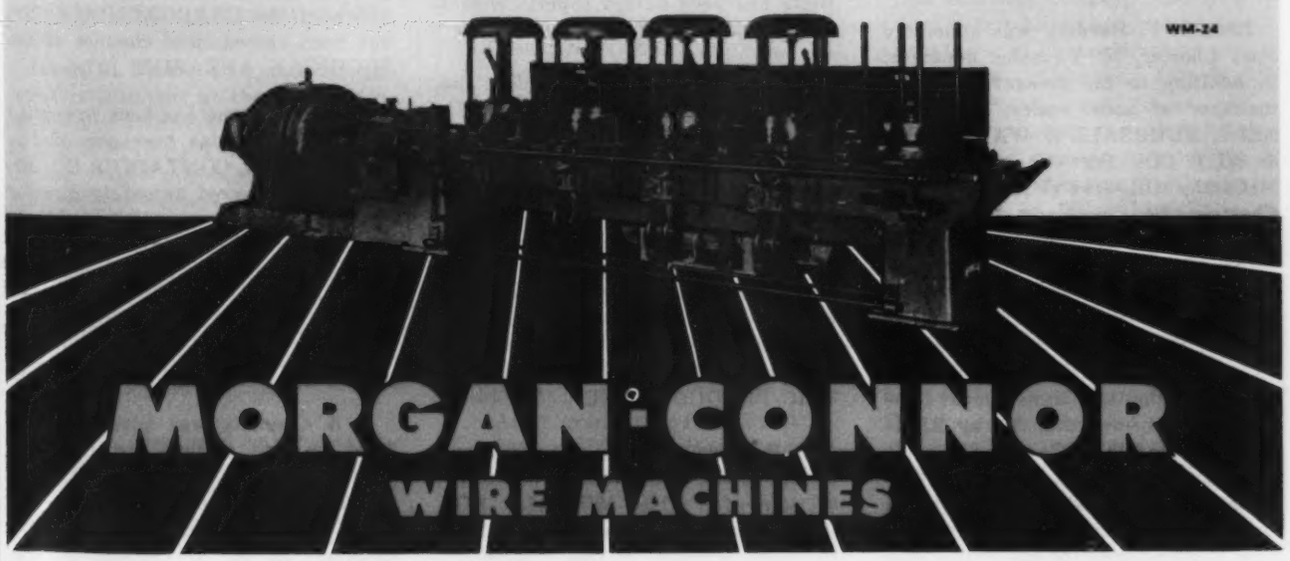
On which of your wire machines are operating costs excessive?

Are these costs high due to low speed? . . . low efficiency? . . . operating too few per man? . . . high repair and maintenance expense? Whatever the cause these machines should be tagged for replacement at the first opportunity.

Why not let a Morgan engineer explain the extra benefits of replacing with Morgan-Connors? Let him help you work out a replacement program in keeping with your budget and production schedule.

MORGAN CONSTRUCTION CO.
WORCESTER, MASSACHUSETTS

WM-24

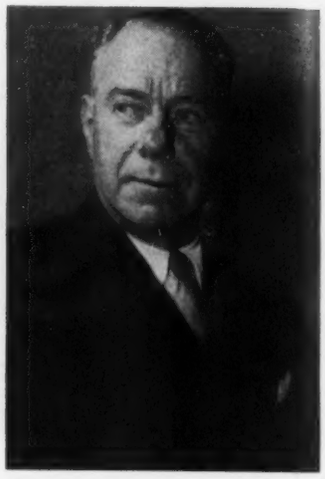


ROLLING MILLS · MORGOIL BEARINGS · REGENERATIVE FURNACE CONTROLS · AIR EJECTORS · PRODUCER GAS MACHINES

Iron Age *Introduces*

MAURICE N. TRAINER, elected president of American Brake Shoe Co., New York City.

JAMES M. CRAWFORD, appointed manager, General Electric's apparatus department's transformer and allied product divisions.



HYNES SPARKS, elected to the presidency of the Symington-Gould Corp., Rochester, N. Y.

George N. Collins, formerly general works manager of J. W. BEARDSLEY'S SONS, has joined WALLACE CLARK & CO., INC., New York.

John H. Burch was appointed sales manager of the Detroit district of the Wickwire Spencer Steel Div. of THE COLORADO FUEL & IRON CORP. Mr. Burch will headquarter in the Detroit district sales office.

Emmett F. Harding was appointed Port Chester, N. Y., sales manager, in addition to his present duties as manager of screw sales, for RUSSELL, BURDSALL & WARD BOLT & NUT CO., Port Chester. **Henry McCarthy** will serve as assistant Port Chester sales manager. **Robert H. Burdsall** was made manager of market development and advertising for the company.

Lloyd H. Angstadt was named director of the Institute of Records Administration and Management Controls to be opened this fall by REMINGTON RAND, INC.

Russell M. MacDonald was made district sales representative for the New England area for the Stoker and Heating Div., FAIRBANKS, MORSE & CO.

Ralph G. Lagerfeldt, formerly vice-president in charge of sales, has been named executive vice-president of COLONIAL BROACH CO., Detroit. **Harry Gotberg**, formerly chief engineer, is now vice-president. **William Kukuk** has been appointed factory manager and **Ben F. Welte**, formerly assistant chief engineer, was advanced to chief engineer with **Glen Harmon** as assistant chief engineer. **Hans Reitz** has been named superintendent of machine construction.

Edward H. Fries, vice-president and secretary of the KEOKUK ELECTRO-METALS CO., Keokuk, Iowa, has been elected president of the Quad Cities Control of the Controllers Institute.

R. A. Juusola, formerly supervisor of industrial engineering, has been appointed plant manager for the weld, wire and small parts operations for the Parts Div., SYLVANIA ELECTRIC PRODUCTS, INC.

A. R. Gaus has been appointed assistant to the vice-president in charge of sales for THE MIDVALE CO., Philadelphia. Mr. Gaus, who has represented Midvale in the Pittsburgh office since 1937, will be stationed in the Nicetown offices of the company.

R. H. McPeake has joined the ALDRICH PUMP CO., Philadelphia, as sales manager.

Vincent A. D'Aprile has been appointed sales engineer to handle hydraulic devices in the industrial field for ELECTROL, INC., Kingston, N. Y.

M. O. Walker, formerly process engineer with the coated products division of the CARBORUNDUM CO., has been named chief chemist of the MICHIGAN ABRASIVE CO.

John H. Strome has been appointed industrial relations manager of INLAND STEEL CONTAINER CO. Mr. Strome has served as safety director since 1948 of iron ore mines and limestone quarries of INLAND STEEL CO., parent company of the container subsidiary. In his new capacity he will be transferred from Ishpeming, Mich., to Chicago, where the subsidiary has general offices and a plant.

J. S. Connelly was advanced from New York to eastern regional sales manager for C. R. DANIELS, INC. A specialist in government sub-contract work, Mr. Connelly is now first assistant to W. E. Carson, general sales manager of the Daniels Industrial Div.

R. D. **Redner** was promoted to sales representative of the Detroit Diesel Engine Div. of GENERAL MOTORS. **John Lundahl** was named to the newly created post of sales representative-at-large for the same division.

George L. Cobb has been appointed assistant general sales manager for the SOULE STEEL CO.'S West Coast operations. Mr. Cobb has been with the company for 16 years and now will be an assistant to **G. B. McClure**, vice-president and general sales manager. **Stanley E. Soule**, son of the president and founder of the company, succeeds Mr. Cobb as district sales manager for northern California and Nevada. Headquarters of the company are in San Francisco.

R. B. Worthy, vice-president, formerly general manager of both the Saltville, Va., and Baltimore operations of MATHIESON CHEMICAL CORP., will now devote his entire time to the Saltville operations, where he will make his headquarters. **Arthur T. Bennett**, vice-president, has been appointed general manager of the Baltimore operations. **Joseph Mullen, Jr.**, was appointed operating manager of the Little Rock, Ark., operations. **H. T. Galt** will serve as assistant operating manager at Little Rock. **James S. Gilliam** has been named operating manager at McKamie and Magnolia, Ark., plants; **R. T. Braun**, operating manager, southwestern acid plants; **W. S. Miller**, operation manager, Houston plant; and **John R. Beatty**, assistant operating manager, Houston.

James M. McGarry has been appointed manager of advertising and sales promotion for the GENERAL ELECTRIC apparatus department's St. Louis office, mid-states district.

James H. Fraser was made administrative assistant at the Poughkeepsie plant of INTERNATIONAL BUSINESS MACHINES CORP. **Ralph L. Palmer** was appointed laboratory manager and **Robert T. Blakely**, assistant to the laboratory manager.

H. R. Mack was made field manager of sales with headquarters in New York for U. S. RUBBER CO. **J. S. Berry** succeeds Mr. Mack as manager of truck tire sales.

Col. **J. G. Vincent** is retiring as executive vice-president of PACKARD MOTOR CAR CO. on Dec. 31. He will be succeeded by **LeRoy Spencer**, vice-president and general manager of EARLE C. ANTHONY, INC., Packard California distributor.

Iron Age Salutes

C. R. MAXON

C. R. MAXON, of the New Jersey Zinc Co., was presented with the first annual Doehler Award of the American Die Casting Institute on Sept. 20. At the ceremonies in Chicago the echoes of the zinc diecasting industry's collective sigh of relief could still be heard. Mr. Maxon was the troubleshooter who turned the trend of a government purchasing policy which had been adverse to the industry.

Government purchasing agents had been discriminating against on-grade zinc diecastings for use in the Panama Canal Zone on the fallacious premise that they were unsuited for the ruthless treatment of a hot and humid climate. That policy was costing the industry money and spreading a vicious rumor of the product's capabilities. Paradoxically, the government PA's were buying such products as trucks, stuffed with diecast components, for Canal Zone use.

Mr. Maxon knew that even in Washington men will sometimes listen to reason—especially when their purchasing mistake was based not on an ironbound conviction but on unfamiliarity with industrial standards. Girded with facts and figures, Mr. Maxon proved to Washington and Canal Zone engineers that on-grade zinc diecastings could survive destructive Panamanian atmospheric conditions.

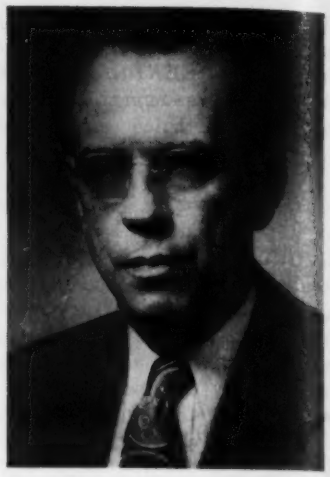
After graduating from Pratt Institute in 1923, Mr. Maxon started work for the New Jersey Zinc Co. At that time the firm's laboratories were working on a new zinc alloy. World War I had showed New Jersey Zinc that zinc diecastings with high strength and dimensional stability were needed, but the industry was anchored with then known alloys.

In 1925 the company had produced a new alloy that had all the advantages of its predecessors and none of its drawbacks. Into Mr. Maxon's hands was placed the trust of promoting the alloy, having it tested commercially by the diecasters to determine whether or not it would be accepted by the industry.

It was. Diecasters were enthusiastic and quickly standardized its use. Mr. Maxon was also instrumental in convincing industry that the new stronger castings had a myriad of possible applications. How successful was he? In 1925, about 30 companies were in the field, using only 15,000 tons of zinc. Today, almost 800 plants produce castings valued at $175 million and use 250,000 tons of zinc.

WILLIAM B. GIVEN, JR., who becomes chairman of the board, American Brake Shoe Co.

LAURENCE H. CARR, named director of engineering and research for Edward Valves, Inc., East Chicago, Ind.



M. R. HATCH, appointed chief engineer, press division, E. W. Bliss Co., Detroit.

Harvey B. Greene, assistant to the president of NATIONAL AUTOMOTIVE FIBRES, INC., has been elected to the post of assistant secretary and assistant treasurer in addition to his present duties.

F. T. Richardson has been appointed director of public relations of AMERICAN CAR & FOUNDRY CO. He succeeds **Arthur Tuckerman,** who is retiring to resume his career as a free lance writer.

Edward D. Rollert, former GENERAL MOTORS executive at Bristol, Conn., and Flint, Mich., has been appointed an assistant to the general manager of the Buick-Oldsmobile-Pontiac Assembly Div. to handle special defense assignments.

J. F. Novy becomes district appliance sales promotion manager for the WESTINGHOUSE ELECTRIC SUPPLY CO.'S Northwestern district.

E. C. Sammons has been named a director of the IRON FIREMAN MFG. CO., Portland, Ore., to succeed **T. H. Banfield,** who died recently. **Frank S. Hecox,** general vice-president and treasurer, has been appointed chief executive officer of the corporation.

Chester F. Conner, manager of industrial products sales of B. F. GOODRICH CO., has been placed on the company's retirement payroll. **Paul W. Van Order** has been named industrial products merchandise manager; **Richard G. Cox,** manager of original equipment sales; **Wilfred A. Smith,** manager of molded, extruded, lathe cut and sponge sales; and **George J. Fischer,** manager of belts and packing sales.

Arch N. Booth was named executive vice-president of the Chamber of Commerce of the United States, succeeding **Ralph Bradford,** who becomes international vice-president, a newly created office.

James F. Smythe, former assistant to the head of design and construction for EBASCO SERVICES, INC., was appointed to the position of contracting engineer for WIGTON ABBOTT CORP., Plainfield, N. J.

Richard Seipt, who has been serving as vice-president in charge of sales for LAMINATED SHIM CO., INC., Glenbrook, Conn., will function in the future as vice-president and general manager. **Merle L. Lockwood** has been appointed vice-president in charge of sales, to succeed Mr. Seipt. **Michael E. Errico** was appointed sales manager.

Ralph A. Mumert has been appointed a sales engineer with F. J. HEARTY & CO. of Los Angeles and San Francisco, west coast representative for EDWARD VALVES, INC., East Chicago, Ind. He will headquarter in Los Angeles.

A. H. Shonkwiler, formerly of WHEELING STEEL CORP., but more recently an executive of BETHLEHEM STEEL CO., has been appointed assistant general manager of the Steubenville Works of WHEELING STEEL. **Thomas R. Moxley** also continues as assistant general manager at the Steubenville Works.

Dr. Roman Smoluchowski, professor of metallurgical engineering at Carnegie Institute of Technology, has been appointed a consultant to the chairman of the research and development board in Washington, D. C.

Donald F. Dimock has been named Michigan district sales manager for NATIONAL ELECTRIC PRODUCTS CORP., Pittsburgh. Mr. Dimock will headquarter in the company's branch sales office in Detroit. The new district manager will supervise sales of the company's wire—cable, conduit and electric roughing-in materials.

H. Braith Davis, chairman of the board of JOHN W. MASURY & SONS, INC., has been elected president of the Enterprise Club of Baltimore.

C. S. Allen was made general manager of the Star-Kimble Motor Div. of MIEHLE PRINTING PRESS & MFG. CO., Bloomfield, N. J.

OBITUARIES

Henry J. Rente, 88, a former vice-president of the American Radiator & Standard Sanitary Corp., died Sept. 13 in Buffalo.

Emil Herman Erickson, 74, vice-president and director of The Trane Co., La Crosse, Wis., died recently.

Dr. John Johnston, who until his retirement in 1946 was director of research for U. S. Steel Corp., died Sept. 12 at the age of 69.

Pinkus A. Newman, founder and president of Newman Wrecking & Salvage Co., Cleveland, passed away recently.

T. H. Banfield, 64, president of the Iron Fireman Mfg. Co., Portland, Ore., passed away recently.

Increase

Cold Mill Production with . . .

MESTA-THOMSON FLASH WELDERS

Mesta-Thomson Flash Welder installed in a Mesta High-Speed Continuous Pickling Line

MESTA MACHINE COMPANY

PITTSBURGH, PA.

Designers and Builders of Complete Steel Plants

On the ASSEMBLY LINE

AUTOMOTIVE NEWS AND OPINIONS

Ford to build Pratt & Whitney 3500 hp engines . . . Other defense announcements expected . . . Skilled help shortage pushes Fifth Wage Round . . . Henry J—less than $1300.

By WALTER G. PATTON

To Build Plane Engines—As everyone expected, the defense program which promises to push automobile production into the background, broke into the open last week. What is undoubtedly only the first of many such announcements was a front page story disclosing that Ford will build Pratt & Whitney engines in the Dodge-Chicago plant. This is the plant in which Tucker started to build automobiles.

Several aspects of the Ford announcement are interesting: (1) This is a *supplemental* activity for Ford in addition to its present automobile production. (2) A number of Ford technicians will be required for the job but the bulk of the labor force will be recruited in Chicago. (3) The new P & W engines will be built in what is now an idle plant. It is expected the military will make every effort to get idle plants back into production before building new ones or taking over facilities presently used for civilian production.

Higher Hp Ratings—Announcement of the new Ford defense contract highlights the difference between military requirements for the present struggle as compared with World War II. The new Pratt & Whitney 28-cylinder aircraft engine to be built by Ford will develop 3500 hp.

The P & W engines Ford built during World War II were rated at only 2000 hp. To make the comparison more emphatic, it should be explained that a B-36 requires six of these engines. It may be recalled that a Liberty ship during the last war was powered by only 2500 hp.

Demand Large—The potential demand for these huge new aircraft engines is staggering. In addition to the B-36, such engines are used in the B-50, the Boeing C-97 stratocruiser, the Douglas C-74 and C-124, and the Martin AM-1 Mauler, the P-4-M Mercator, and the Fairchild C-119. Best guess is that it will be at least a year and a half before Ford can get into volume production on its huge aircraft powerplant.

Detroit is alive with rumors about production of war products by automobile companies. In announcing its intention to build aircraft engines, Ford disclosed that industrial mobilization planning for this job began late in 1948 when talks were opened between Pratt & Whitney and *several different automobile manufacturers.* Planning has continued steadily since 1949, Ford said. It is also indicated that much of the preliminary work has been completed. During World War II, in addition to Ford, Buick, Packard, Studebaker, Nash, Dodge, and Chevrolet built airplane engines.

Labor Shortage a Big Stick—The big stick behind the fifth wage round is the shortage of skilled labor. This is the factor which strongly influenced Chrysler in its decision to grant a voluntary 10¢ wage adjustment. The acute shortage of skilled technical help also dictated the settlement of the tool and die strike here last week. The new agreement provides a 15¢ increase for skilled workers; it also has an escalator clause geared to the cost-of-living index and a 5¢ annual improvement factor. The new agreement runs for 3 years. Managers of tool and die shops frankly admit this is the cost of labor peace in Detroit today in the face of persistent raids from other industrial centers.

Detroit Sunday newspapers are filled with luring advertisements for skilled help from other U. S. cities, particularly the West Coast. Unconfirmed is a report that a West Coast firm has been offering workers 50¢ per hr over their present

rate, moving expenses to California, guaranteed housing and a minimum annual wage for 3 years. With the shortage of technically-trained help dominating the Detroit industrial scene even before the draft or large scale war production, many Detroit personnel supervisors were wondering last week just how bad the present labor situation would get.

Kaiser May Build Ships—There are strong indications that Kaiser-Frazer Corp. may soon be in the shipbuilding business. No contract with the Government has yet been signed but negotiations have gone far enough so that Edgar Kaiser has entered into a contract with George C. Sharpe, New York naval architect, for design work on new types of fast merchant ships.

Automobile prices generally are going up. Nash and Kaiser have announced price advances. Other manufacturers are expected to follow suit when new models are introduced. It is reliably reported, however, that the Henry J light car to be introduced soon by Kaiser-Frazer will be available at a price of less than $1300. This price, it is reported, will apply to the 4-cylinder model which will be available *without* and *with* an accessory package. The 6-cylinder Henry J will probably be in the neighborhood of $200 higher in price. These are factory delivered prices and do not include transportation, state and local taxes, licenses and titles.

Electron Microscopes Shown—During the past week the eighth annual meeting of the Electron Microscope Society of America was held in Detroit. American, Canadian and European technicians were on hand to compare notes on their researches in bio-chemistry, biophysics, physical chemistry, metallurgy and medicine. Included in the exhibits was the Philips electron microscope developed in Holland, the new EMT model, developed by Radio Corp. of America and the latest radiation counters, vacuum equipment and microtomes for slicing thin biological specimens to a thickness of 500 to 1000 times less than the human hair.

Nickel Shortage Felt—The nickel shortage has already hit the automobile industry. Several automobile manufacturers have reported cutting back nickel plating from .0015 to .0010 in. It will not be surprising if further reductions are necessary before the start of the new year.

At a press preview last week, Hudson showed its 1951 models including the new "Hornet" which will be powered by a new 145 hp, 6-cylinder, L-head engine. The new Hudson models will be introduced Oct. 13.

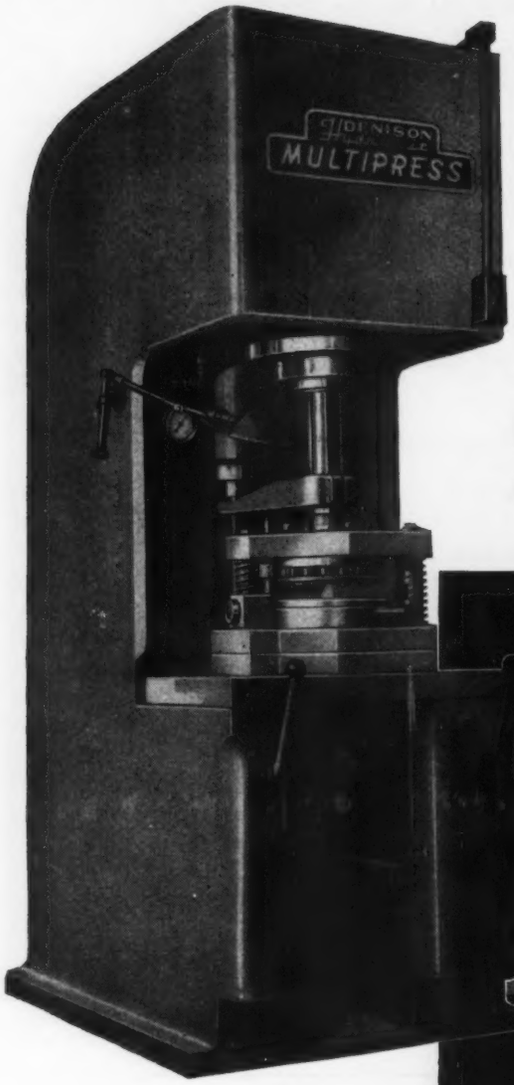
Allison Plant—A new tank transmission will be produced by General Motors' Allison Div. before the year ends at its newly-leased plant here. Formerly occupied by the Fairbanks-Morse Co. before its purchase by Chrysler Corp., the building has 215,000 sq ft of floor space. It is now being reconditioned and machinery is being installed.

A postwar development, the tank transmission will be installed in tanks to be built by the Cadillac Motor Div. in Cleveland. Transmission assembling, testing, and additional machining will take place in Allison plant No. 3. An area of 100,000 sq ft is being cleared for these operations.

Pension Checks — The first Chrysler pension checks went out recently to 110 retired employees over 65. All men are covered by the corporation's pension agreement with the UAW-CIO. Only 63 in the first group retiring have had 25 years' service, entitling them to maximum benefits of $100 a month. Chrysler has announced that 82 pct of its remaining 1842 employees 65 or older have elected to continue working.

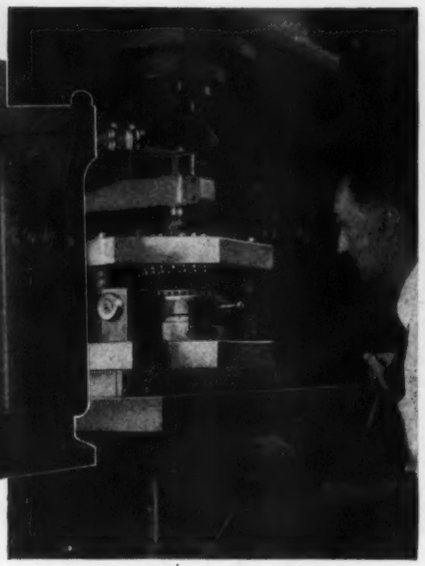
THE BULL OF THE WOODS — By J. R. Williams

HAH-HAH! YOU MISSED IT, HONK--OL' BIG BEN TRYIN' TO PUT OUT TH' FIRE AT A DRINKIN' FOUNTAIN--A PAPER OF MATCHES IN HIS HIP POCKIT --HOLD ME UP!
OL' HAP, TH' BEST MACHINIST IN THIS SHOP, BUT HE'S NEVER BEEN MADE A BOSS-- BECAUSE HE HASN'T TH' LEAST BIT OF DIGNITY!
IT'S ONE OF THE FINEST OF ALL TH' FREEDOMS, BUT IT DOES SEEM TO WEAKEN YOUR STANDING!
9-29
J.R.WILLIAMS
KEPT DOWN
COPR. 1950 BY NEA SERVICE, INC. T. M. REG. U. S. PAT. OFF.

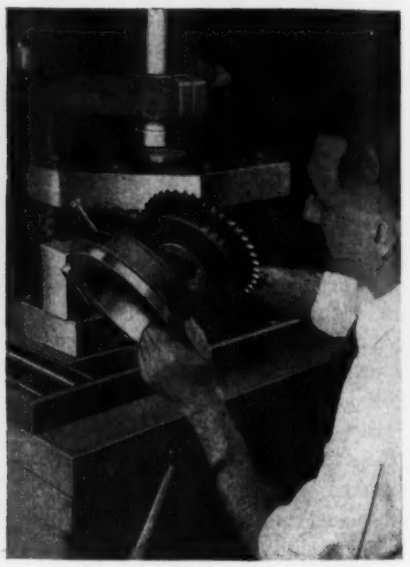


35-ton MULTIPRESS® DOUBLES PRODUCTION On Riveting Job

Also eliminates need for inspection . . . cuts straightening needs . . . ends rejects



Close-up of Multipress and the special ram tooling about to process 18 rivets at a single stroke.



Special press tooling rotates and pivots for easy loading of assembly with loose rivets in place.

THE 35-TON MULTIPRESS above handles a tricky riveting job for Harley-Davidson Motor Company, Milwaukee, *twice as fast as the previous equipment!* Along with this phenomenal gain in production, rejects have been cut to near zero . . . straightening of finished units has been slashed 89 per cent . . . inspection of riveted assemblies is no longer necessary . . . and the riveting itself is done better than ever before!

With Multipress, one downward sweep of the ram processes up to 18 rivets in wheel-sprocket and brake-hub assemblies. Each rivet gets uniform pressure, smoothly and accurately applied. Correct alignment of parts is automatic. Rejects dropped to less than ½ of one per cent. In addition, press tooling and fixtures can be changed in a few minutes to any of several similar riveting jobs.

The compact, space-saving model L Multipress delivers up to 35 tons of smooth oil-hydraulic power at ram speeds up to 530 inches per minute. It offers a choice of quick, easy manual control of ram action, or completely automatic control. Stroke length is infinitely variable up to 15 inches. Ram speed, pressure and stroke-length can be preset quickly for a wide range of precision needs.

Among the many standard Multipress accessories available are six and 12-station indexing tables. They assure fast, safe feeding of work to the press ram, and facilitate the use of automatic loading and ejection equipment. Other production boosting Multipress accessories include equipment for pelleting, straightening, coining, high-speed feeding of continuous metal strip, and many others. Multipress is available in many sizes, with capacities from 1 ton through the 35-ton range. Write today for full details.

DENISON Hydr OIL ics

The DENISON Engineering Co.
1158 Dublin Road **Columbus 16, Ohio**

WEST COAST PROGRESS REPORT

Digest of Far West Industrial Activity—By R. T. REINHARDT

Smog Solution Expected—Outcome of the 2-year battle between gray iron foundries and the Los Angeles County Air Pollution Board probably will be known before the end of October.

Baghouses with some kind of washing processes before the blast hits the bag appears to be the most likely solution to the demands that the foundries cut dust discharges to minute proportions. Whiting Corp. and National Cornice, and Kennard, and Drake are working on equipment which each expects to meet county tests within the next few weeks. Foundrymen have had difficulty, however, getting any firm commitments other than from Kennard and Drake who propose a close cupola with bag house.

Legal Battles Loom — Herco Foundry, which has served as the test case on all previous hearings, has been denied a permit to operate with further extensions denied. Several other foundries have found similar fates. Most of them are operating, however, despite the lack of a permit and an extensive legal tangle may result.

If a guaranteed solution is provided in the next 2 weeks, however, it is likely that most of the companies will sign up. Earlier estimates of the equipment costing about $10,000 appear to be far wrong with $30,000 said to be a closer figure in the final analysis.

A Happier Note—Foundrymen in both Los Angeles and San Francisco areas are generally enjoying unprecedented business with practically all plants working at capacity or near-capacity.

Demand for cupola cast has steadily increased as business improved and pig iron becomes tighter. Most tonnages moving last week in Los Angeles were going for between $43.00 and $45.00 with the top of the range in San Francisco being $1.00 higher. Openhearth demands have been drying up the pig supply and foreign iron, deliverable on an "if and when basis" is being quoted at around $56.00 per gross ton, delivered.

Subcontracting May Spread—Subcontracts for speeded-up aircraft manufacturing may be spread from southern California around the country if the plans announced by Lockheed Aircraft Corp. are carried out by others as well. Lockheed reports that it will give out subcontracts for major components of its planes.

Aircraft Wage Boost Asked—Wage negotiations between unions and southern California aircraft plants are expected to open soon. The union's first move has been to send Paul Rosso, assistant department director of the CIO United Auto Workers, from Detroit to seek an increase of 20¢ an hr for workers at North American Aviation, Inc. A letter of request has been written to Douglas Aircraft Co. asking it to open its contract for higher pay also, union officials said.

No Brownout — Reports that William H. Harrison, head of NPA, informed primary aluminum producers that they could depend upon a full and firm power supply even if civilian brownouts would be entailed, had repercussions in the Northwest where more than half of the country's primary aluminum is produced.

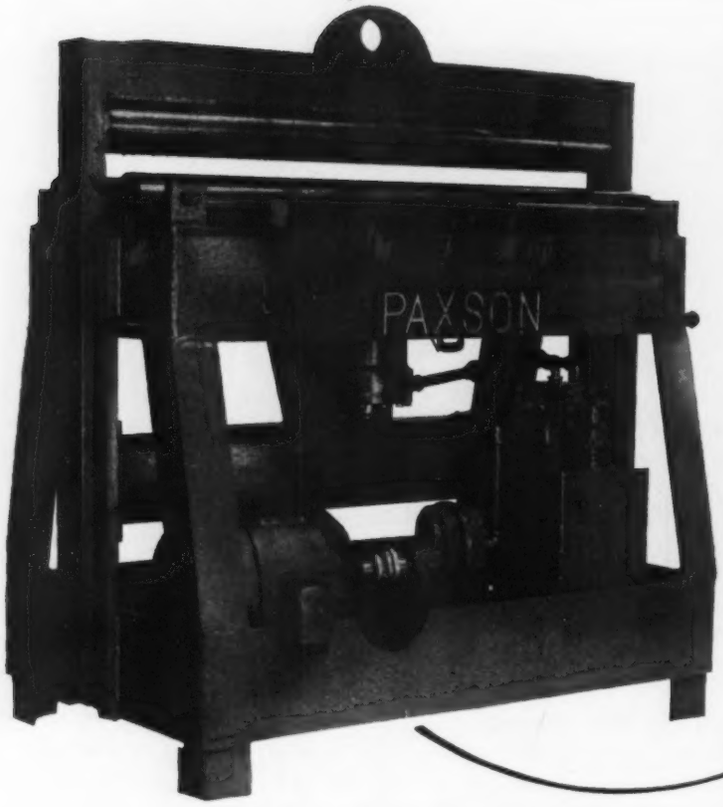
Paul J. Raver, Bonneville Power Administration, is of the opinion that such brownouts will not be necessary if non-essential civilian use of aluminum is restricted.

It is his opinion, however, that with normal water supplies and full use of available steam generating capacities, all aluminum production could be maintained at capacity. He does urge speeding up the construction of additional power producing facilities.

Geneva Starts Construction—Geneva Steel Co., Geneva, Utah, last week started construction on facilities to produce hot-rolled sheets. Estimated cost of construction is $3 million and the unit is scheduled for completion the middle of 1951. The Geneva organization is handling the overall construction job and the initial contract was let to F. H. McGraw & Co.

PAXSON GIVES YOU THE EDGE

This NEW Slitting Aid simplifies COIL-END STRAIGHTENING



This latest Paxson development simplifies the job of straightening coil ends before starting them through the slitter. Speeds production . . . provides operating economy. Write for details of this Coil-End Straightener or consult us on any slitting problem.

✔Portable
✔Compact
✔Hydraulic

PAXSON MACHINE CO.

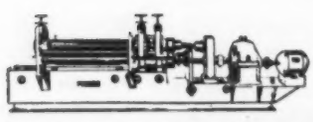
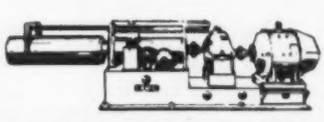
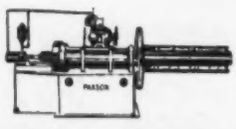
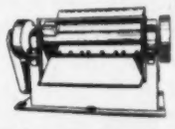
SALEM • OHIO

Engineers and Builders of Cold-Rolled Strip-Mill Equipment

SPECIALIZING IN SLITTING LINES

Do You Fly?

2800 ft. E.W. runway and club house, private field 2 miles west of Salem, maintained for your convenience. Wire or phone arrival time. We will meet your plane.

SLITTERS • STRAIGHTENERS • PAY-OFF REELS • COILERS • SCRAP WINDERS • SCRAP CHOPPERS

REMEMBER, ALL PAXSON LINES ARE CUSTOM BUILT

THE FEDERAL VIEW

THIS WEEK IN WASHINGTON

By EUGENE J. HARDY

Where Are the Clowns?—A surprising chapter in the steel industry's political career is being written this week. A new congressional committee is starting a fresh investigation of the steel industry to find out if basic productive capacity is adequate.

Every time a congressman wants to know how much barbed wire was made last year he issues a call for Ben Fairless, Ben Moreell, half-a-dozen board chairmen, and—of course—the newsreel and television boys. All too often, the result is a three-ring circus.

New Method Used—But Senator Lyndon Johnson, D., Tex., and Donald C. Cook, vice-chairman of the Securities & Exchange Commission, have different ideas. No fanfare. No floodlights. In fact, no hearings—at least, not at this time. Mr. Cook, who's being loaned by SEC to serve as counsel to Senator Johnson's Preparedness Subcommittee of the Senate Armed Services Committee, is a quiet, efficient scholar of industry who believes he can learn more about steel capacity through correspondence and interview than senatorial windbags can pick up in a month of public hearings.

It looks as though the industry's rejuvenated public relations attitude is beginning to command new respect at the Capitol.

New Pricing Quiz—A Senate committee hurled a fresh barrage of questions concerning freight absorption at the Federal Trade Commission last week, thus proving that Senator Ed Johnson meant what he said several months ago about "riding herd" on that agency until the complicated pricing issue is settled.

The questions contained in the new questionnaire will not be made public until the FTC has had an opportunity to examine them and issue its replies, according to Senator Johnson, D., Colo., who heads the Senate Commerce Committee and the "watchdog subcommittee" charged with reaching a settlement on the legality of delivered pricing.

Members vs. Staff—The FTC's answers to an earlier questionnaire were "not very satisfactory" in the opinion of most members of Mr. Johnson's "watchdog" group. Actually, the root of the trouble lies in the fact that the four members of the FTC *could probably be brought around to agreeing* on the legality of freight absorption, but are opposed by the politically-potent professional staff members of the commission.

Congress is fully aware that the war and the currently tight steel market have relegated the basing-point problem to the list of relatively unimportant legislative problems. But the fact remains that the issue will have to be resolved sooner or later, and it is to this end that the Johnson group is planning a new phase of public hearings on the subject.

Control Planning—Congress has warned the Administration to go slow on plans for wage, price and rationing controls. This action took the form of a $30 million slash in the requested $60 million for administering the Defense Production Act. (THE IRON AGE, Sept. 21, p. 81.) Congress, in effect, told the President to go ahead and institute the controls needed now, plan for those that might be needed in the future and set up the agencies; $30 million ought to be enough for this and if more is needed later we'll take another look.

Excess Profits Tax—Political shenanigans still surround Congressional action on an excess profits tax. No better illustration can be had than the vote to commit the present Congress to approve an excess profits levy, effective Oct. 1 or July 1, 1950, when the members return late in November, or, failing this, to bind the new 82nd Congress to approve such legislation. Should there be a large turnover in membership as a result of November's elections, it is difficult to see how a large body of "lame ducks," repudiated by the voters, could morally carry out such a commitment.

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Schedule 40—Standard Weight—Seamless & Welded
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FEATURE ARTICLES

Better Cores at Lower Cost by Electronic Baking

Two years' experience with synthetic core binders and electronic core baking shows higher quality, lower cost, than with oil-fired baking. Savings on binder materials alone exceed $4000 yearly. Savings also accrue from faster core baking and reduced heating costs.

By VICTOR E. HILLMAN
Director of Research,
Crompton & Knowles Loom Works, Worcester

FOLLOWING promising results from a series of laboratory tests, electronic core baking equipment and synthetic core binders were put in production use about 2 years ago in the foundry of the Crompton & Knowles Loom Works. The experience of these 2 years has shown electronic core baking with synthetic resin binders to be extremely satisfactory. Some oil-fired baking ovens are still in use for cores too large or otherwise unsuited for the electronic unit. However, in general, it has been found that electronic equipment yields better cores much more rapidly and at lower cost than did the oil-fired equipment previously used for all cores.

Baking cores in oil-fired ovens has several disadvantages. Fuel costs are not low. Considerable time is required to bring ovens up to heat. A baking time of 2 hr at a minimum of 350°F is necessary for the oil and cereal binders used at Crompton & Knowles. Areas around ovens are often too hot for comfort of workers.

Because uniformity depends upon heat transmission into a core whose constituents are poor heat conductors, it is seldom attained in oven baking. A bake of 2 hr minimum is commonly required. Cores with thin sections over-cure if time is allowed for full baking of thick sections. If full curing is not done, cores are not strong and give off excessive gas when the casting is poured. This tends to make cores porous and permeable to metal and results in cleaning difficulties besides tending to produce blow holes in castings. In addition, the usual oil and cereal binders result in core sand sticking to casting walls, thus making cleaning and machining slower and more costly. Frequently, mechanical cleaning is necessary.

Synthetic resins can be used in conventional core ovens. Their use speeds up baking time about 33 pct. There are, however, certain problems with fumes produced both in the oven, and later, if complete oven curing is not attained. But if the right curing is achieved, resins of proper composition do yield better oven-baked cores than the commoner binders.

The general advantages of electronic core baking are by now well known (THE IRON AGE, May 4, 1950, p. 90). The Crompton & Knowles setup uses a Thermonic tunnel-type machine of 30 kw input capacity. The average baking time is about 2 min, or less than 2 pct of the time required for oven baking. This alone is a marked advantage. It permits continuous baking on a conveyer which carries the cores between the plate elec-

trodes of the heater. Baking time is shortest when electrodes are adjusted to come within 1 in. of the cores. But it is more convenient to leave electrodes set for the highest core being run if several heights are being placed on the conveyer. Conveyer speed is adjusted accordingly. In this way, all heights are fully cured.

Overbaking Cannot Occur

Actually, the conveyer speed is adjusted to fully bake the cores of the thickest section in process. In electronic baking, every molecule passing between the electrodes is heated equally and simultaneously, regardless of section thickness or distance from electrodes. This is a primary difference between oven and electronic baking, and accounts for the high speed and uniform baking of all cores, regardless of their section thickness, in the latter.

In practice, the energy applied in electronic baking goes very largely into evaporating the moisture in the core and converting it into steam. As soon as the moisture is removed, the heated resin is set, and energy input falls off rapidly. Curing is complete when the baked core is carried out from between the electrodes by the conveyer. By the time cores leave the machine, they are cool enough to handle and are transferred to racks ready for use in the foundry.

The heat energy required per pound of core mix depends largely on the percentage of moisture in the mix. A graph of energy requirements is shown in Fig. 2. At Crompton & Knowles, moisture content ranges from 2.6 to 3.8 pct in cores before baking. Mulling is carefully controlled by weighing the sand and dry ingredients and by measuring the volume of water and of kerosene employed.

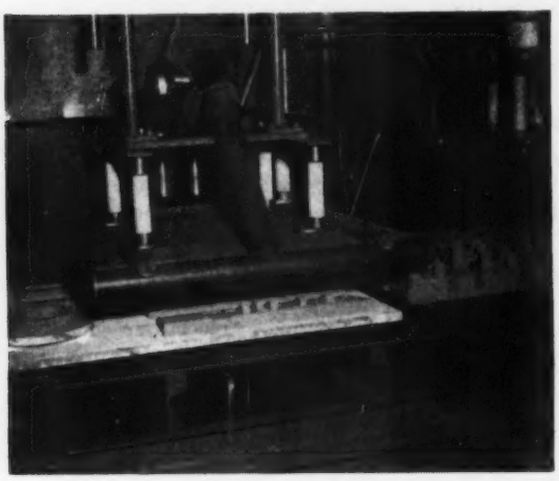

FIG. 1—The interior of the electronic core baking oven, showing a tray of cores passing between the electrodes.

Cores are considerably harder, stronger and smoother than those baked in ovens. They have lower gas content and disintegrate so completely after pouring that they disappear in the shakeout. Cored surfaces are left free of sand so that cleaning is simplified and sand inclusions do not give tool troubles in the machine shop. Because gas content is low, blow holes are avoided and the percentage of rejected castings is minimized.

In electronic baking, the average resin content required is 0.6 to 1.0 pct. If oven baking is used, about 1 pct of resin binder is needed and a temperature of about 350°F is required, as against 235°F maximum with electronic baking. This lower temperature affects every molecule of the core uniformly, does not depend on conduction of heat, and causes very rapid setting of the binder. Resin fumes are practically nil in the well-ventilated electronic unit, but are likely to cause trouble in conventional ovens unless exceptionally good ventilation is provided.

Binder Cost Is Much Lower

At Crompton & Knowles, for oven-baked cores, oil costs $1.00 per gal and the oil cost per ton of mix is $7.20. The 1.0 pct of resin for electronic baking costs only $4.40 per ton of mix. With electric energy at 1.5¢ per kw-hr, the cost of energy for electronic baking per ton of cores is $1.05 to $1.20. Fuel oil per ton of cores baked in ovens runs about $3.50.

Thus, the total cost per ton of cores is much

TABLE I

BINDER AND POWER COSTS

COST OF CORE OIL FOR ONE-TON MIX

			Cost of Oil			

Cost Of Resin Binder For One-Ton Mix

Electronic Baking Power Cost

less for electronic than for oven baking, and superior cores are obtained. The total foundry saving has not been precisely evaluated, but is known to be substantial. Considering binders only, the saving is $2.80 per ton. Using 6 tons a day, this saving alone is $4200 in a year of 250 working days. Detailed cost figures are shown in Table I.

Since the use of synthetic resins has been found highly economical, especially for electronically baked cores, it seemed in order to investigate and test several makes and types. This has been done with 12 different binders, listed in Table II. Binder F, American Cyanamid Co.'s Cycor 151, yields cores of highest tensile strength. This resin also gives highest transverse strength and highest hardness of the resins tested, and is moderate in cost. It is the standard binder now in use at Crompton & Knowles and is the one used for the above cost figures.

This resin, which is a urea-formaldehyde type, contains no filler or otheradditive. One pct of the dry powder is added to 800 lb of dry sand. Also added are 4 lb of Mogul cereal binder, 2.5 lb of boric acid as a catalyst, 8 lb of kerosene and 28 lb of water. The mix is first milled dry for 2 min, then for 2 min after adding water and for 1 min after adding the kerosene.

TABLE II

PHYSICAL PROPERTIES[1] OF CORES WITH DIFFERENT TYPES OF RESIN BINDERS

Binder	Type[2]	Pct Used	Average Properties		
			Transverse, lb	Tensile, psi	Hardness
A	UF powder	1.0	27.6	163.5	75–80
B	UF liquid	2.0	57.7	312.5	89–93
C	UF powder	1.0	38.1	207.3	87–91
D	UF liquid	2.0	48.7	310.0	93–98
E	UF powder	1.0	30.5	211.2	90–94
F	UF powder	1.0	58.0	355.0	95–100
G	UF liquid	1.0	46.6	289.0	95–97
H	PF liquid	1.0	18.7	132.0	70–80
I	PF liquid	1.0	24.0	153.0	79–84
J	PF liquid	1.0	22.9	153.5	80–86
K	UFM powder	1.0	29.5	202.0	90–92
L	UF powder	1.0	29.4	188.0	88–95

[1] 80–70 Ottawa test sand
1.0 pct cereal
3.5 pct moisture
2-min cycle
high-frequency oven

[2] UF—Urea formaldehyde
PF—Phenol formaldehyde

After mulling, the sand is riddled and then transferred in buckets to core-making stations. Most of these stations are along a wire belt conveyer, on which exploded silica trays containing cores are placed after being loaded at the core-making stations. Some cores are made by hand but an increasing number are blown. A Tabor rollover machine is used for large cores when quantities warrant the core box equipment needed.

Just before entering the electronic baking machine, cores are passed through a fog chamber where they pick up a small amount of water on their surface as a means of increasing surface hardness in baking. The resulting surface is both hard and abrasion resistant. Sand does not slough off, as it does on oven-baked cores.

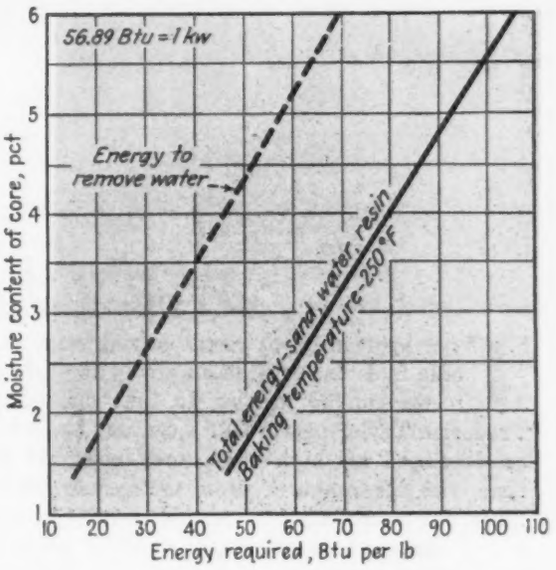

FIG. 2—The energy required to bake cores, in Btu per pound, plotted against the amount of moisture in the core mix.

Recently a short conveyer has been added at the output end of the electronic heater. This conveyer avoids the need for having a man constantly stationed at this end to remove trays of cores as they emerge. Several trays can run into this short conveyer before they have to be removed.

Skin Irritation Eliminated

One reason often advanced against the use of synthetic resins as core binders is their skin irritation factor. The facts show, however, that only a small percentage of core makers are thus affected, and these can avoid such effects by keeping exposed surfaces of the skin clean, especially hands and arms. For this purpose, extra wash stands have been provided near core-making stations and core makers are required to wash often. This has eliminated all irritation.

The advantages of electronic core baking may be summarized as follows: Rapid automatic conveyerized baking; complete baking at lower and precise temperature; no under or over baking; excellent shakeout; cores of good collapsibility; permeability, high strength, and hardness; good dimensional stability; low core scrap; lower casting rejects; cores usable immediately after baking or after indefinite storage. Space requirements are low, the core room is not hot, and no oven warm-up is needed. Smoke and fumes are minimized. The high production rate and low cost, about 45¢ an hr, of operating the electronic unit are important, as is the low cost of superior cores that do not pick up moisture before or after placing in molds.

High-Speed

THE application of metal cutting with carbide tools has created an era in the field of metal cutting similar to that opened by Frederick Taylor nearly half a century ago when he developed his high-speed steel tools. At the time, full advantage of these tools could not be taken due to the lack of capacity, rigidity, speeds and horsepower in the then existing machine tools. Many of the present designs of machine tools have somewhat similar characteristics in relation to carbide tools.

Advanced development in metal cutting at high speeds has been made by Jones & Lamson Machine Co., not only for their customers but in their own shop work.

It was generally accepted prior to 1945 that in cutting steel with carbide, the speed range would run approximately 275 to 300 sfpm. The cutting speeds used by J & L run as high as 1200 sfpm. Metals cut range from 1045 carbon steel to the 52-100 series which runs up to 1.1 pct carbon and 1.6 pct chrome, with hardness varying in accordance with requirements from 200 to 400 Bhn.

The author witnessed several tests at Jones & Lamson on machines of the types and models furnished to industry for manufacturing ball races. The material was heat treated 52-100 steel. The operation involved on the first machine, a 16-in. automatic lathe, was facing and boring. The forging used was 6½ in. OD, 1⅝ in. wide, with ⅝ in. wall thickness. The boring was performed at 543 sfpm, with 0.018 in. feed per revolution. Facing on the large diameter was at 670 sfpm with feed of 0.012 in. per revolution. The power required was 25 hp.

A second machine was turning the outside of the same ring and facing. For these operations the speed was 670 sfpm with 0.024 in. feed for turning and 0.013 in. for facing. Approximately 34 hp was required.

The final operation on the same ring was forming the inside groove approximately ¾ in. wide and perhaps a little over ⅛ in. deep. The cutting speed on this operation was 945 sfpm with a feed of 0.0044 in., cutting time 2½ sec, and 51½ hp was required to make the cut. The power required when machining this groove with a single tool on the machine is really amazing.

Jones & Lamson made numerous tests in developing the design of the tools used. They started with a tool having zero rake and went in both directions by degrees into positive and negative rake. It was found for turning the outside of the forging that the longest tool life was obtained when the tool had 3° negative rake, whereas on the boring, 2° positive rake gave the best results. In addition, the boring tool was made at about 45° lead angle, so that in feeding in, the 45° edge presented itself to the work instead of the usual straight, blunt edge of the tool. This increased tool life considerably.

High Speeds Also Used In Thread Cutting and Milling

Another machine, a standard turret lathe, was set up with a hydraulic bar stock handling attachment, making bolts out of 8749 steel with the following sequence of cuts: Pointing the bar, turning with box tool with roller support, reducing end of the bolt for threading operation, then the threading operation using a self-opening die, and finally cutting off. The bolt was 5¼ in. long, 5 in. under the head, and turned in one cut from 1⅜ in. to 0.813—0.001 in. body diam. and 0.750—0.001 in. thread diam. The die head was equipped with carbide-tipped chasers. The feed used in turning was 0.015 in. per rev. The machine was set for running at 2000 rpm and no change of speed was made even for the threading operation, where it equalled 390 sfpm. Surface finish of body was within 15 microinches. The operation is pictured in Fig. 1.

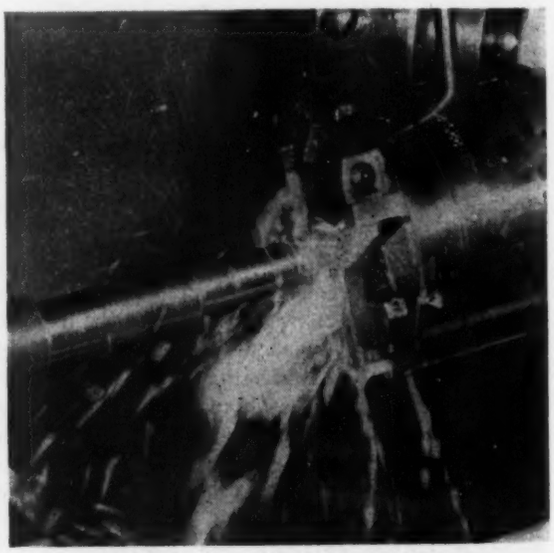

FIG. 1—Cutting ¾—10 N. C. Class III thread on 8749 steel bolts at 2000 rpm, a speed of 390 sfpm.

Machining

AN ANALYSIS

Machining tests at speeds to 1200 sfpm reveal information about tool shape, coolant, chip formation and other factors. Analysis of cutting wedge formation helps understand tool performance.

By IVAN A. SWIDLO, Works Manager,
Springfield Armory, Springfield, Mass.

In the high-speed cutting of metal, Jones & Lamson do not limit themselves to turning operations. The author also watched milling of bars about 24 in. long by cutting two flats, 1/16 in. deep by 1½ in. wide. The material was 8613 steel, approximately 166 to 187 Bhn. This operation used a cutter with inserted high-speed steel blades of Apex design, having about 12 teeth, 6 in. diam. It ran at 315 sfpm with 20 ipm feed, and a chip load per tooth of 0.0084 in. An unusual thing is the shape of the tooth which has a radial rake of 32°, with 5° primary clearance on the top of the tooth and 14° side rake. In cutting this material, approximately 3 hp was required. It was found that horsepower requirements were invariably lower with high-angle milling.

The tooth was extremely sharp, of the type normally only used in wood cutting. No definite reasons for the success of such a cut have been advanced. Absence of heat and low chip compression are important factors. Proper application of coolant to the tool below the chip is critical. It was noted that the cut itself was climb milling, the machine was rigid and the depth of the cut was shallow.

It is noticeable in all operations where relatively low speeds are used that the chips coming off the machine are blue, while at high cutting speeds the chips have practically no discoloration but look "white"; that is, the original metal color.

The prerequisite of success of such application of cutting metal at high speeds is the use of very massive, rigid machines, free from vibration in the spindle, tool holders, tailstocks and headstocks. It is necessary that the machines have the required speeds and horsepower. It is also necessary to have work which is itself sufficiently rigid to withstand such speeds.

Good Tool Life Can Be Obtained

It has been found by experimentation and trial cuts that if tool life is plotted against cutting speed on a chart, there are certain speeds at which tool life begins to fall, but as soon as the cutting speed is above that point, tool life begins to increase. This phenomenon is explained to some extent by certain action of the metal itself. The formation of the chips at high speeds is different from those formed at low speeds. The chip pressure on the tool is farther from the tool point at the high speeds than at low cutting speeds. This pressure against a more solid part of the tool is not as destructive as conventional speeds which produce pressure concentration at the point itself.

The coolant has a great effect on cutting life.

It has been found necessary to apply a sufficient volume of coolant, usually soluble compound, not only on the top of the tool, but also a strong stream of coolant underneath the cut to cool the point of the tool. It was also found, when an interrupted cut is made, that it is better not to use coolant at all. This is probably explained by the fact that when the tool cuts the metal on continuous cuts, heat is generated and tool is protected by the chip from being suddenly chilled. So it maintains an even temperature. But during the gap of an interrupted cut, the point of the tool is completely exposed and chilled, making it brittle. Tool life is thereby reduced.

In actual production of parts at Jones & Lamson, turning is mostly done on turret lathes, machines which are very difficult to guard as far as coolant is concerned. Therefore most of the operations are run dry. Even without coolant, cutting speeds usually exceed 300 sfpm.

In analyzing chip formation in order to discover the reason for such remarkable performance of the tools, specimens of metal have been prepared and micro-etched in order to analyze what happened to the crystals of the metal below the surface that was machined. As Fig. 2 shows, in each case where low speeds like 60, 112, or 210 sfpm were used, there is noticeable distortion of the solid metal below the machined surface. As soon as cutting speeds begin to exceed 300 sfpm it can be seen that the crystals, even near to the machined surface, retain their original form.

Cutting Wedge Influences Tool Life

Perhaps longer tool life can be explained, at least partially, by the formation of the so-called "cutting wedge." Research work was conducted by Prof. N. N. Sawin in 1930-1932, at Skoda Works, Czechoslovakia, on cutting metals. Using high-speed motion camera, he observed the formation of a wedge at the cutting point of a tool. This wedge, illustrated in Fig. 3, was formed from loose, tiny particles of chip under cutting pressure and high temperature. The cutting wedge breaks into two uneven parts at the line A-A. The particles of the wedge in area B exert pressure on the top side of the tool and move along with the chip. The particles in area C move along the front of the tool and are the most important factor in producing rough surfaces evidenced by galling and tearing.

Observing the film of the process of cutting, taken by the high-speed camera, the development of the cutting wedge in front of the cutting edge, breaking of it into uneven parts, its instant dis-

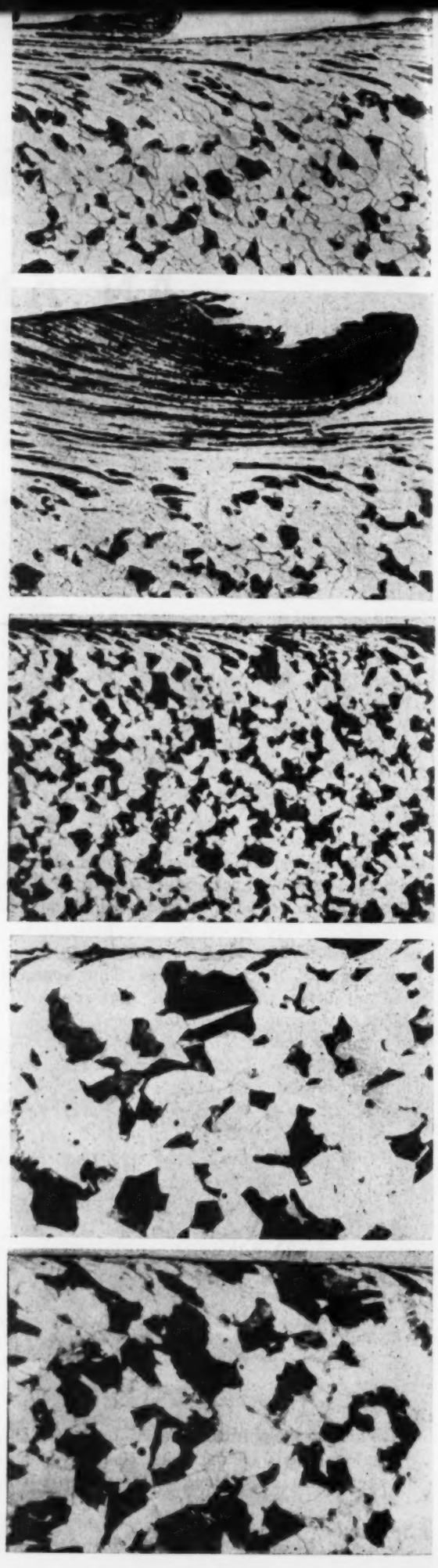

FIG. 2—Photomicrographs showing distortion of grain structure below machined surfaces. Speeds are: A, 62 sfpm; B, 112 sfpm; C, 210 sfpm; D, 300 sfpm; and E, 1000 sfpm. 200X.

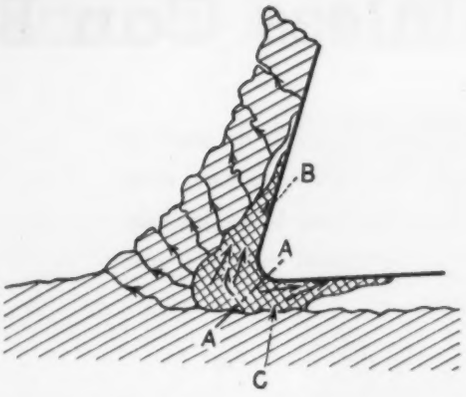

FIG. 3—The wedge which forms at the cutting edge of a tool, made up of tiny chip particles under cutting pressure and high temperature.

appearance, and the formation of a new wedge can be seen plainly. The rapidly moving particles of the cutting wedge, because of their much greater mobility and lesser solidity than the chip itself, damage the tool far less.

The pattern or profile form of a cutting wedge usually points out the natural contour of the tool which was selected in accordance with factors and conditions of each individual case of metal cutting; that is, the metal cut, cutting speed, rate of feed, and generated heat or method of cooling. The profile of this cutting wedge influences the formation and shape of chip and moves the point of contact of chip pressure further back from cutting edge, resulting in longer tool life.

Prof. N. N. Sawin, in one of his experiments studying formation of chip, cutting wedge, tool life and surface finish, used a lathe with variable spindle speeds giving from 50 to 435 sfpm. The speed could be varied during cutting. Material in this case was carbon steel, with 0.50 pct carbon; depth of cut was 0.01 in.; feed 0.005 in. per rev, using a carbide tipped tool with nose radius of 0.040 in. Using different tools for finishing cuts during his study of formation and disappearance of the cutting wedge, at various cutting speeds, changing the speed without stopping spindle or interruption of cut, Prof. Sawin very often found the critical speed at which the cutting wedge completely disappeared, resulting in very fine finish of machine surface. But tool life is not good at this speed.

From his study of cutting metals, using high-speed camera, Prof. Sawin definitely established that formation of a cutting wedge helps the process of cutting and considerably increases tool life, but quite often loose particles of the C area, Fig. 3, weld themselves to the tool, resulting in a poorly machined surface.

More Uses for Radioactive Tracers

ONE of the problems in the investigation of current and metal distribution in electrodeposition has been the fact that heavy thicknesses were required for obtaining accurate measurements under the microscope. In making heavy deposits, changes in the shape of the cathode and, consequently, of the current distribution have been unavoidable. A new method, described by J. Kronsbein at the recent AES Convention in Boston, has therefore been adopted to measure very thin deposits and to trace the current distribution accurately.

The new technique requires extensive apparatus, but is very easy to operate. Very short periods of deposition are required, since very light thicknesses, substantially under 0.00001 in., may be measured with a high degree of accuracy. By this means, changes in cathode shape and also polarization effects are held to a minimum, yielding measurements which give a truer picture of the conditions.

A known fraction of radioactive copper 64 is introduced into a copper sulfate solution, from which copper is deposited upon a cathode at a known average current density. The cathode is then cut into strips, and the amount of codeposited radioactive copper is determined by means of a Geiger counter. The distribution of radioactive (and, therefore, also of stable) copper on the cathode can thus be established within very close limits. Satisfactory distribution determination can be made of extremely thin deposits. The method is especially suitable for ascertaining primary current distribution on an electrode.

Another method to illustrate primary metal distribution by means of radioactive isotopes is to proceed as above with the application of part radioactive and part stable copper in known proportions and then to use the radio autographic technique of photographing the disintegrating copper atoms. At those parts of the cathode where most copper is deposited, there will be more disintegration and consequently the photographic film will be most blackened.

Stainless Can Be

Brazed joints for gas turbine service must have physicals as good as the high-temperature base alloys at 1600° to 1800°F, and not fail even at 2000°F. With standard brazing, such joints have not been possible. But tests with dry H_2 atmosphere, special application methods, and a new brazing alloy, show they can be made.

Part I

FURNACE copper brazing of plain carbon and low alloy steels has been increasing in usage for many years. Today, copper brazing is an accepted fabrication method when distortion can be kept to a minimum and many joints can be made at one time.

The use of a reducing atmosphere such as hydrogen or cracked city gas during the brazing cycle has made it possible to eliminate the use of molten flux, thereby decreasing the necessary joint clearance, increasing the joint strength.

Brazing of high chromium stainless steels, however, has not been common. No suitable heat and corrosion resistant brazing alloy has been available. Also, commercial hydrogen brazing atmospheres are oxidizing to chromium and a coating of flux is used to facilitate brazing.

Stainless materials can be brazed without the necessity of a flux by the dry hydrogen process. This process is not new[1, 2] but has had very limited application. The dry hydrogen brazing process is essentially the same as the commercial hydrogen brazing process except that the hydrogen atmosphere has a dew point of —40°F or below. It is not possible to maintain this low dew point in commercial furnaces which have the standard type door openings and ceramic brick linings. However, by using a sealed metal retort a very low dew point can be readily maintained.

[1] F. C. Kelley, "Properties of Brazed 12 Pct Chrome Steel," THE IRON AGE, 1939, Nov. 2, p. 33 and Nov. 9, p. 34.
[2] F. C. Kelley, "Heat Processing Easily Oxidized Metals," THE IRON AGE, May 20, 1948, p. 84.
Mr. Peaslee, who was associated with Mr. Boam in this investigation, is now with the Wall-Colmonoy Co., Detroit.

The furnace used for dry hydrogen brazing at the Wright Aeronautical Corp. is shown in Fig. 1. It is a double-ended electric furnace having a 2300°F maximum operating temperature. The center heating zone is equipped with molybdenum elements protected by a dissociated ammonia atmosphere. At either end of the furnace there is a water-cooled antechamber which enables the load to be cooled rapidly under atmosphere.

Dry hydrogen is prepared from bottled hydrogen by first passing it through a palladium catalyst tower to combine any traces of oxygen with the hydrogen to form water. The hydrogen then goes through an activated alumina drying column. The dry gas, now having a dew point of

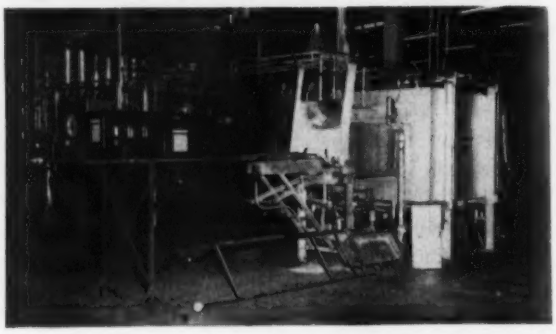

FIG. 1—The double-end electric furnace used for brazing stainless steels, in a dry hydrogen atmosphere, for high-temperature service.

—80° to —100°F, is routed to the brazing retort. The retort consists of a bottom tray equipped with gas inlet and outlet pipes and a thermocouple tube. The top of the retort fits into a U-shaped trough around the bottom tray and the joint is sealed with alumina sand. To maintain a dry atmosphere in the retort the hydrogen flow through the sand seal must exceed the back flow of the moist air attempting to enter the retort. The flow of hydrogen used is 3600 to 4800 cfm.

The metals used in the hot gas stream of a gas turbine must operate for long periods of time in an oxidizing atmosphere at temperatures around 1200° to 1800°F. To be satisfactory, the brazed joint must have physical properties comparable to those of the base metal in this operating range, as well as a suitable strength through at least 2000°F so that accidental overtemperature operation will not result in complete joint failure.

Copper Alloy Not Suitable

The most common brazing alloy having a high melting temperature is copper. Copper, however, does not have suitable corrosion and oxidation resistance and its strength drops off rapidly with increasing temperature. During the last war the Germans developed an 85 pct silver-15 pct manganese brazing alloy for use in attaching turbine blades to rotor disks. But investigation of this alloy showed that it was much harder to handle than copper, its properties were lower, and its melting temperature of 1760°F was too close to modern gas turbine temperatures.

Brazed For 2000°F Service

By **ROBERT L. PEASLEE**, Supervisor, and **WILLARD M. BOAM**, Senior Metallurgist,
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In Wright's search for a suitable brazing alloy, such materials as gold and its alloys, Monel, and palladium alloys were considered. The material which seemed most suitable was a nickel-chromium-base hard facing alloy, made by the Wall-Colmonoy Co., having a solidus temperature of 1850°F and a flow point of around 1950°F. This alloy presented new problems in brazing, since it could be procured only in powder form or as cast bars having a hardness of about 60 Rc. However, preliminary investigation of the alloy showed such good results that an extensive program was undertaken to develop a procedure for using the powder form.

High Brazing Temperature Needed

This alloy, which has the tradename of Colmonoy No. 6, was found to flow and braze very well in the dry hydrogen atmosphere. However, the composition of the alloy is such that solution with most stainless alloys is very rapid. So it has been found advisable to use the highest possible brazing temperature, to obtain a complete joint coverage before the brazing alloy dissolves enough base metal to raise its melting point so high that high viscosity and freezing result.

AISI 347 stainless steel was selected as the base metal to be investigated for the class of parts where materials are only lightly loaded and where fair oxidation resistance is required.

AISI 431 stainless steel was used to represent the hardenable stainless steels as a second class of base metals to be investigated. This material has fair corrosion resistance and high strength characteristics up to 900°F. Two hardness levels were investigated to ascertain the effect of hardness on butt tensile and shear brazed joints.

It was found that alloys such as Type 321 stainless steel, containing up to about 0.60 pct titanium, were difficult to braze in pure dry hydrogen and this difficulty increased with the higher titanium content. Alloys containing substantial amounts of aluminum also showed poor characteristics in the dry hydrogen atmosphere.

In setting out to obtain data on the physical properties of brazing alloys, the first problem was the proper method of supplying brazing alloy to the joint. If the joint is narrow this is very simple, but when the joint becomes as much as 9/16 in. square and the base materials have poor thermal conductivity, more difficulty is encountered. On the larger joints where the brazing alloy is placed at the outside, the perimeter of the joint frequently brazes, leaving a void at the center—the last portion of the bar to come up to heat. The test specimen used for this investigation was designed to assure the best and most uniform brazed joint.

The specimen used was arranged for internal feeding through a hole drillled in the top block of the two base metal blocks to be brazed together. Zero clearance between the blocks was maintained by clamping the blocks together and tackwelding at the four corners of the joint.

A measured quantity of the brazing alloy was placed in the feed hole and the blocks were brazed in pure dry hydrogen. With Colmonoy No. 6, the blocks were brazed at 2150°F. With oxygen-free copper wire, the blocks were brazed at 2050°50F, and with silver-manganese, brazing was done at 2150°F. Two tensile or impact specimens were machined from each block.

Double-Shear Specimens Used

The shear specimens used in this program were of the tongue and slot, double-shear type. Specimens were made from bar stock by first machining the tongue and slot ends, maintaining zero clearance or line contact. Specimens were then mounted in a V-block with the desired overlap and the powdered brazing alloy was placed on top of each of the two joints and held in position by a drop of Acryloid B-7 cement. After brazing, the side faces of the joint were ground flat and the specimen threaded. One reason for using this type of specimen was that the fillets at either end of the joint could be re-

moved thereby eliminating any effect they might have had on the shear results.

Since Colmonoy No. 6 had been found to dissolve and penetrate the base metal rapidly, it was desirable to determine the nature and extent of this characteristic. It was believed that the amount of brazing alloy present and the length of time at the brazing temperature were the controlling factors of the degree of solution and penetration. To evaluate these factors, round specimens of the base metal were used, each with a drilled blind hole.

The amount of Colmonoy No. 6 placed in the drilled hole and the time held at 2150°F were varied. The amount of base metal in solution and the extent of brazing alloy diffusion were measured on cross-sections of these specimens by projecting the line of the side wall of the drilled hole and measuring at 16X magnification to the new location of the unfused base metal, and to the deepest discernible alloy diffusion zone.

Effects of Oxidation Checked

The high temperature oxidation resistance of Colmonoy No. 6 brazing alloy along with that of copper and silver-manganese was not known. The test method devised for obtaining a numerical rating for the effect of varying lengths of time in the high temperature oxidizing atmosphere was based on the use of a finished machined, butt brazed tensile specimen. The test was made by varying the length of time and the holding temperature at which the specimens were held in still air. Then all specimens were tensile tested at room temperature and the effect of oxidation on their strength was determined.

The ultimate tensile strength data of Fig. 2 show that the Colmonoy No. 6 butt brazed properties at AISI 347 are very close to that of the base metal. The data for the room temperature, 1200° and 1500°F points show very good uniformity and fit the base metal curve very well.

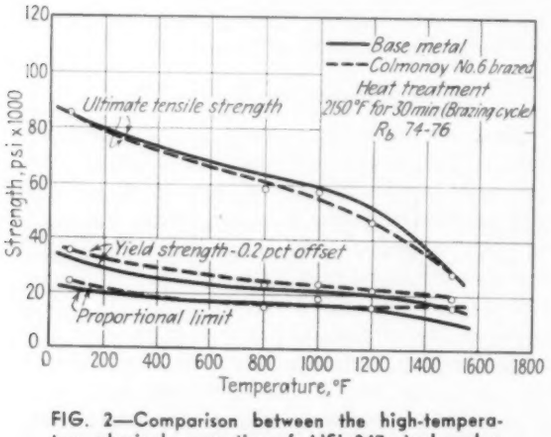

FIG. 2—Comparison between the high-temperature physical properties of AISI 347 steel and a joint made by butt brazing two blocks of the steel with Colmonoy No. 6.

The 0.2 pct offset yield strength and the proportional limit data for the Colmonoy No. 6 butt brazed specimen are seen to be slightly higher than for the base metal.

The reduction of area data for the AISI 347 show the tendency of the Colmonoy No. 6 in a brazed joint to restrict the plastic flow of the base metal around it. Data taken showed that the reduction of area at the brazed joint is essentially the same regardless of the location of failure, whether at the joint or in the base metal. The base metal reduction of area, however, varies rather drastically with the location of failure. When the failure occurs at the brazed joint, the base metal reduction of area is similar to that at the brazed joint location, while failures in the base metal of a brazed specimen result in a much higher reduction of area—65 to 75 pct—in the base metal than that observed—40 to 55 pct—in an unbrazed metal specimen. Examination of data and specimen showed that the location of failure could not be related to any variation in tensile strength.

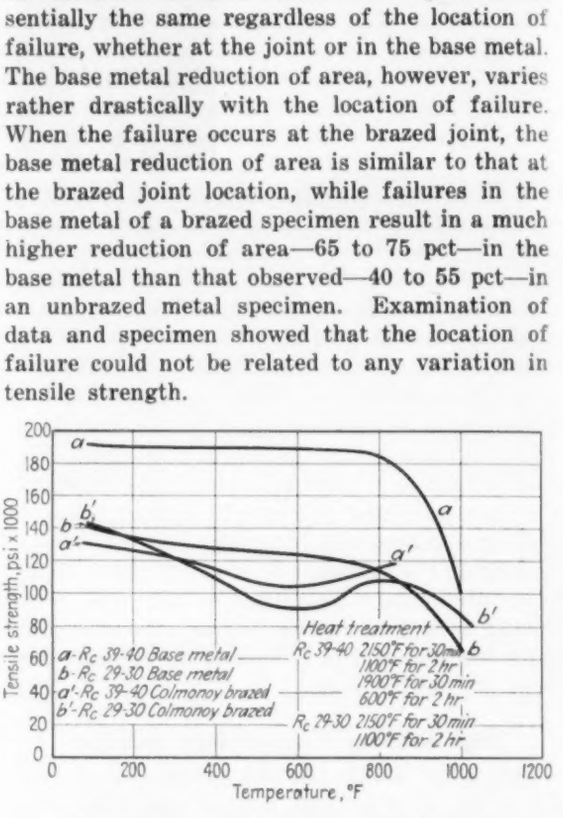

FIG. 3—Comparison between the high-temperature physical properties of AISI 431 steel of two different hardnesses, and joints made by butt brazing blocks of the same steel with Colmonoy No. 6 in a dry hydrogen atmosphere.

AISI 431 in the quenched and stress relieved conditions has a 190,000-psi ultimate tensile strength at room temperature and is best suited for operating temperatures up to about 850°F. This alloy was used to show the effect of two different hardness levels on the ultimate tensile strength of a Colmonoy No. 6 butt joint. As Fig. 3 shows, the Colmonoy No. 6 brazed specimens have almost the same tensile strength at the Rc 30 and Rc 40 hardness levels. The exact reason for this behavior is not known, although the authors feel it is due to a combination of two factors. One is the lower ductility of the high hardness base metal which results in poor load distribution at the brazed joint during tensile testing. The other and probably the more important factor is the relatively low strength of the resulting alloy formed by solution of the AISI 431 base metal in the brazing alloy. Thus, higher hardness of the base metal produces no increase in the brazed specimen strength.

The location of failures for the brazed AISI

431 tensile specimens at both hardness levels investigated was through the joint area. The 0.2 pct offset yield strength and proportional limit data were not obtained on the brazed AISI 431 specimens. However, on all past data it has been found that when the ultimate tensile strength of the brazed specimen is above the base metal yield strength and proportional limit, the yield strength and proportional limit of the Colmonoy No. 6 brazed specimens follow very closely that of the base metal. Since the AISI 431 base metal has a high yield strength and proportional limit, the Colmonoy No. 6 brazed specimen would probably have its yield strength and proportional limit 5000 to 10,000 psi below the base metal.

Hardness Affects Shear Strength

AISI 431 also was used at two hardness levels to evaluate the effect of base metal hardness on the shear strength of Colmonoy No. 6 brazed joints. The data in Fig. 4 show that a higher shear strength could be obtained with this base metal but it was found that up to 700°F the specimens having the higher hardness level—Rc 40—had lower shear strength than the specimens of Rc 30 hardness level. The cause of this phenomenon is considered to be the same as that for the butt tensile data of the same material. All failures of the Colmonoy No. 6 brazed shear specimens occurred through or near the joint.

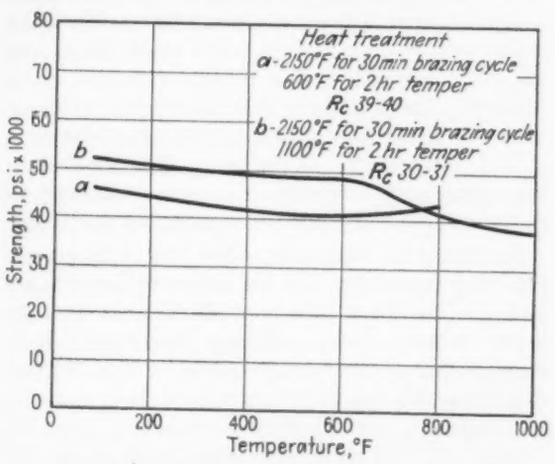

FIG. 4—Comparison between the shear strength of double-shear joints made with AISI 431 steel of Rc 30 and Rc 40 hardness, brazed with Colmonoy No. 6 in a dry hydrogen atmosphere.

Brazing alloys, such as copper and silver-manganese, show relatively little solution and penetration of the stainless steel base metal during brazing. Colmonoy No. 6, on the other hand, is a low melting stainless alloy that very readily dissolves or penetrates the stainless steel base metal alloys. To obtain a numerical evaluation of the solution and penetration quality of Colmonoy No. 6, the penetration specimen previously described was used. With the aid of this specimen the effect of the quantity of brazing alloy and time at heat were investigated, with results as shown in Fig. 5.

From the data it was observed that regardless

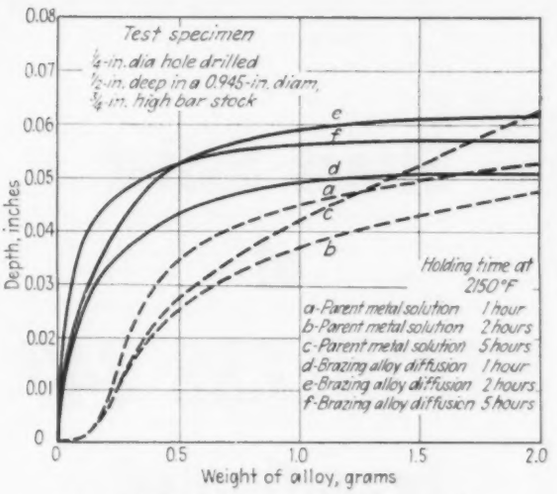

FIG. 5—Depth of base metal solution and brazing alloy diffusion plotted against weight of brazing alloy used. Base metal was AISI 431; the brazing alloy was Colmonoy No. 6.

of holding time at the brazing temperature, the penetration of the brazing alloy into the stainless base metal takes place first and at a rapid rate. The solution, or dissolving away, of the base metal does not appreciably occur until 0.5 g of alloy are reached. With added brazing alloy the base metal solution becomes quite rapid.

Considering the foregoing information, it is increasingly apparent that the quantity of Colmonoy No. 6 brazing alloy at any one location must be kept to a minimum. It should also be noted that a small residue or skeleton is sometimes left when the lower melting constituents of the brazing alloy are pulled into the joint before melting is completed. The remaining residue as well as the joint material has changed in chemical composition to such an extent that a readily machinable material having a hardness of Rc 30 then exists.

Colmonoy No. 6 cannot be preformed for placement like soft wire alloys. It was, therefore, necessary to obtain a method of holding the powdered form alloy in place prior to brazing without interfering with the dry hydrogen atmosphere. An acrylic resin called Acryloid B-7 was found to be particularly suited for this purpose. This resin, thinned out and used in small quantities, does not interfere with the dry hydrogen brazing atmosphere. The most interesting feature of this resin was that it can hold the powdered alloy on the underside of a part all the way up to the brazing alloy melting temperature without dropping even the smallest particle.

Acknowledgment

The authors acknowledge the help of Herman Hanink, Asst. Chief of the Materials Laboratory, for his help and assistance throughout this program, and L. Glasier of the Materials Evaluation Unit and other members of the staff who aided in preparation of these data.

Part II of this article will present a detailed analysis, made at temperatures up to 2000°F, of S-590 joints brazed with Colmonoy No. 6 and other brazing materials.

Stress Relief of STAINLESS 347 Investigated

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Tests show that the amount of stress relief that can be obtained in type 347 stainless is more dependent on temperature than on time. The percent stress relief accomplished at any one temperature in the range of 932° to 1652°F was found to be about the same whether the material was stressed to 39 or to 75 pct of the yield strength.

SPECIAL applications of type 347 stainless steel weldments sometimes require maximum amounts of stress relief. Since temperatures of about 1450°F are known to decrease the ductility of type 347 weld deposits, it is desirable to know the quantitative relationship between time, temperature and amount of stress relief before a stress-relief cycle is decided upon. An investigation was therefore conducted for the purpose of furnishing approximate data on the amount of stress relief obtained when type 347 is treated at temperatures between 932°F and 1652°F for periods ranging from 15 min to 16 hr.

Test strips of type 347 stainless were prepared from ⅛-in. thick, mill-annealed sheet stock of the following composition: 0.07 pct C, 18.09 pct Cr, 0.78 pct Cb, 11.3 pct Ni, 0.04 pct N, 1.3 pct Mn and 0.82 pct Si. This stock was stress-relieved at 1800°F for 15 min and air-cooled. It was then cut into strips ¼ in. wide and 7 in. long with a bandsaw, the length direction being kept parallel to the sawblade in order to minimize distortion. After a few strips had been cut, it was noticed that some of them had a twist, in addition to a slight longitudinal bending. While the amount of internal stress necessary to cause bending of such a relatively long beam is so small that it could be ignored, a twist in such a narrow beam is evidence of considerable internal stress.

For this reason, the finished strips were given a further straightening anneal by sandwiching them between two smooth-faced thick plates and annealing at 1800°F for 15 min, followed by an air cool. The top plate weighed 67 lb; temperature was measured by a thermocouple placed in a hole in the center of the plate. The air-cooling rate between the two plates was slow enough so that the material could be considered stabilized.

Examination showed that the two short stress-relieving treatments did not affect the grain size, and the hardness was lowered a total of only 3 Rb. After the straightening anneal, the strips were probably straighter and in a more stress-free condition than it would have been possible to obtain by any machining or grinding procedure.

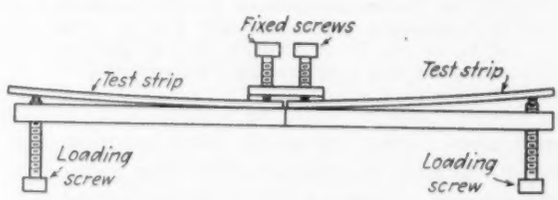


FIG. 1—Strip loading jig used in the tests, arranged so that two strips could be loaded simultaneously. Strip deflection is exaggerated in the drawing.

The strip specimens were then loaded into a jig constructed as shown in Fig. 1. Advancing the end loading screws on this jig increased the stresses in the test strip. Since the dimensions of the strip were known and the deflection caused

by the loading screw could be measured, the amount of stress was calculated from the cantilever beam and flexure formulas. The loaded jig, with a thermocouple attached, was then placed in a furnace which was held at the desired temperature. In order to minimize scaling of the jig, these tests were carried out in a converted-gas atmosphere with a gas-to-air ratio of 2.5 to 1. After being held at the stress-relieving temperature for the required length of time, the jig was air-cooled, the loading screw was backed off, and the distance between the end of the now plastically-deformed beam and the jig was measured.

Internal Stress Simulated

The principle utilized here was as follows: If no stress relief had occurred during the treatment, the test strip would have elastically recovered from all of the deflection produced by the loading screw and the stress relief would therefore have been considered to be zero per cent. If, on the other hand, all stress had been relieved, the test strip would show no elastic recovery and its deflection after the loading screw was backed off would have been the same as when the strip was first loaded. In this case, stress relief would have been considered to be 100 pct. A measure of the permanent set of the test strip is, then, a measure of the amount of stress relief.

Deflection obtained by means of a loading screw simulates the type of stress encountered in an internally-stressed object in that as more stress is relieved by plastic yielding, there is less total stress in the object.

Assuming that the material remains unchanged, the amount of plastic deformation that will occur in the test strip is a function of time, temperature, and stress intensity. The influences of time and temperature were measured by making tests at 932°, 1112°, 1292°, 1472° and 1652°F for periods of 15 min, 1 hr, 4 hr, and 16 hr at each of the five temperatures. The influence of stress intensity was evaluated by stressing one strip on the jig close to its elastic limit and the other strip to one-half that value.

The test strips were 0.25 in. wide, 0.13 in. thick, and 7 in. long. The moment of inertia of such a beam is 4.58×10^{-3} in.^{4} The ends of the loading screws and fixed screws were half-cylinders, 0.125 in. long and 0.125 in. in radius. It was noticed that some strips did not bear uniformly across the width of the loading-screw end. This non-uniform loading was thought to be of little significance in such a narrow beam.

The loading screws were somewhat loose; a maximum sidewise play of about plus or minus 0.02 in. was measured. Increasing the deflection of the beam increases the effective length of the beam; the difference between the length of the beam deflected 0.21 in. and that deflected 0.11 in. was about 0.02 in. The effective length of the beam deflected 0.11 in. was 6 in. A test calculation, however, showed that the influence of beam length upon the calculated stress values is small; a difference of 0.1 in. changed the calculated fiber-stress values by only 800 psi—a relative error of 2 pct. Therefore, to simplify calculations, the length of the beam was taken as 6 in.

Deflection was measured at the end of the beam under the line of loading, using a machinist's scale graduated in hundredths of an inch. Test calculations showed that a difference of 0.01 in. in deflection resulted in a fiber-bending stress difference of approx 1500 psi, so deflection was measured as accurately as possible. In the strips stressed to approximately one-half their yield strength, the possible relative error of stress-relief measurement values is 10 pct. The values of the strips stressed to 75 pct of yield strength have a possible relative error of 5 pct due to measurement.

Since the modulus value (E) for austenitic steels is difficult to determine and reported values differ by as much as 2.5×10^6 psi, it was decided that the modulus should be determined directly from the test strips. To accomplish this, a test strip was mounted in the jig with the fixed screw; the jig was then inverted and clamped in a vise while weights were suspended from the end of the strip. The measured deflections are tabulated in Table I.

TABLE I

LOAD-DEFLECTION DATA

Load, grams	Deflection, in.	Deflection per 500 g, in.
500	0.055	0.055
500	0.06	0.06
500	0.06	0.06
1000	0.11	0.055
1000	0.115	0.058
1000	0.115	0.058
1500	0.175	0.056
1500	0.17	0.57
1500	0.17	0.57

Using the cantilever beam formula, with $\Delta = 0.06$ in. and $p = 1.10$ lb (500 g), the modulus of elasticity was calculated and found to be equal to 28.8×10^6 psi. This was rounded off to 29×10^6 for use in the calculations.

The 0.2 pct yield strength of the specimen was 47,000 psi. This figure has little significance in the calculations since it is based on a 2-in. gage length. The effective gage length of the strip deflection would probably be smaller and hence would decrease this value. Also, since most of the plastic deformation occurs near the fixed-screw end of the strip, the magnifying effect of the lever-arm of the strip would tend to decrease the yield strength by making very small deflections measurable. It was found by test that the first measurable permanent set (0.005 in.) occurred when the strip was deflected 0.285 in., but at a deflection of 0.275 in., the strip elastically recovered all deflection. A calculation based on

a deflection of 0.28 in. was made; from this the yield strength of the strip was found to be 44,000 psi. This is the stress at which the outermost fibers of the specimen yield a measurable set; 44,000 psi is the yield strength value used in the subsequent calculations.

One strip was deflected 0.21 in. and the other 0.11 in. before the loaded jig was placed in the furnace. The calculated maximum unit stresses on the outermost fibers were:

Beam deflected 0.21 in.—33,000 psi (75 pct of yield str.).

Beam deflected 0.11 in.—17,300 psi (39 pct of yield str.).

The test data and calculated stress-relief values are tabulated in Table II. In this table, D_0 is the measured initial offset of the strip (from the jig) after tightening the fixed screw. D_1 is the measured distance between the deflected strip and the jig before being placed in the furnace. D_2 is the measured distance between the strip and the jig after removal from the furnace and loosening of the deflection screw. In only one specimen (A30) was there any difference between the D_1 measurements made before and after the loaded jig had been in the furnace. In this one case, D_1 was only 0.01 in. less after removal from the furnace; this difference was probably due to a movement of the loading screw while the samples were at temperature.

TABLE II

STRESS RELIEF TEST DATA

Strip No.*	Temp., °F	D_0, in.	D_1, in.	D_2, in.	Time to Reach Temp. min.	Time at Temp. hr.	Stress Relief, Pct
A1	932	0.17	0.38	0.22	15	¼	24
A2	932	0.20	0.41	0.26	15	1	29
A3	932	0.04	0.25	0.065	60	4	12
A4	932	0.18	0.39	0.23	15	16	24
B1	1112	0.14	0.35	0.21	20	¼	33
B2	1112	0.20	0.41	0.265	20	1	31
B3	1112	0.16	0.37	0.23	30	4	33
B4	1112	0.25	0.46	0.33	20	17.5	38
C1	1292	0.18	0.39	0.26	25	¼	38
C2	1292	0.17	0.38	0.27	25	1	48
C3	1292	0.15	0.36	0.23	25	4	38
C4	1292	0.155	0.365	0.25	25	17	45
D1	1472	0.14	0.35	0.24	15	¼	48
D2	1472	0.13	0.34	0.23	15	1	48
D3	1472	0.10	0.31	0.24	15	4	67
D4	1472	0.08	0.29	0.22	15	6	67
E1	1652	0.07	0.28	0.23	10	¼	76
E2	1652	0.15	0.36	0.34	10	1	90
E3	1652	0.07	0.28	0.24	10	4	81
E4	1652	0.035	0.245	0.22	10	6	88
A10	932	0.11	0.22	0.14	15	¼	27
A20	932	0.10	0.21	0.12	15	1	18
A30	932	0.04	0.15	0.04	60	4	0
A40	932	0.10	0.21	0.13	15	16	27
B10	1112	0.10	0.21	0.13	20	¼	27
B20	1112	0.14	0.25	0.18	20	1	36
B30	1112	0.12	0.23	0.175	30	4	50
B40	1112	0.08	0.19	0.12	20	17.5	36
C10	1292	0.11	0.22	0.17	25	¼	55
C20	1292	0.08	0.19	0.145	25	1	59
C30	1292	0.15	0.26	0.20	25	4	45
C40	1292	0.13	0.24	0.19	25	17	55
D10	1472	0.14	0.25	0.18	15	¼	36
D20	1472	0.065	0.175	0.125	15	1	55
D30	1472	0.06	0.17	0.12	15	4	55
D40	1472	0.05	0.16	0.11	15	6	55
E10	1652	0.04	0.15	0.11	10	¼	64
E20	1652	0.10	0.21	0.20	10	1	91
E30	1652	0.04	0.15	0.04	10	4	73
E40	1652	0.02	0.13	0.12	10	6	91

* Strips A1 to E4 inclusive had initial stress of 33,000 psi (75 pct of yield strength). Strips A10 to E40 inclusive had initial stress of 17,300 psi (39 pct of yield strength).

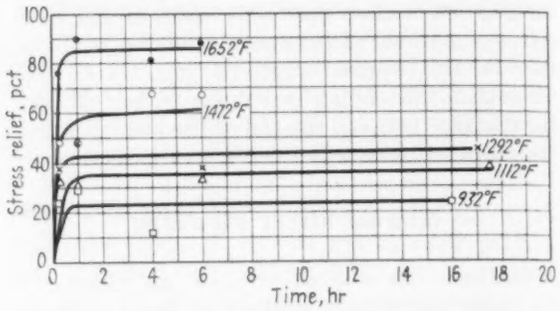


FIG. 2—Stress relief-time curves for type 347 stainless steel at maximum fiber stress of 33,000 psi (75 pct of yield strength).

From the spread of the data, the curves as drawn in Figs. 2, 3 and 4 hardly seem justified. Published data, however, illustrate the same type of stress relief—time curves. Kempf and Van Horn's work[1] was done with aluminum alloys and a stressing jig similar in principle to the one used in these tests. Hiemke's results[2] were obtained on 1.4 pct Mn boiler steel and no mention was made of the method used for measuring the stress relief. It should not be overlooked that each point on the curves represents only one test reading. If the plotted points had been the averages of a number of duplicate tests, more consistent data would undoubtedly have resulted.

The lines drawn in Fig. 4 represent the general trend only. The deflection measurements introduce into the stress relief values possible relative errors of the magnitude of 10 pct in the strips stressed to 39 pct of the yield strength and 5 pct in those stressed to 75 pct.

In addition to the measurement errors, there are sources of error in the test setup itself. The set-screw holding the fixed end of the strip relaxes at elevated temperatures; when removed from the furnace after a test at 1290°F or above, the strip is so loose in the jig that it will drop

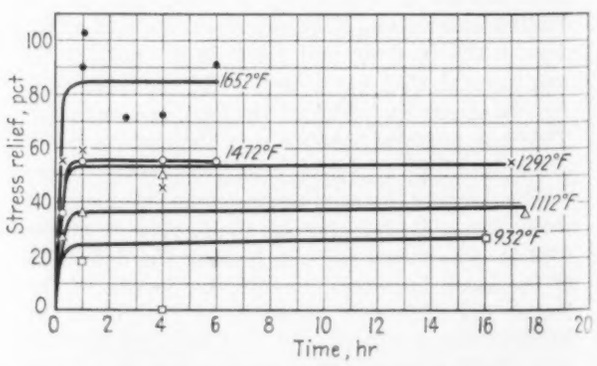


FIG. 3—Type 347 stainless steel stress relief-time curves at maximum fiber stress of 17,300 psi (39 pct of yield strength).

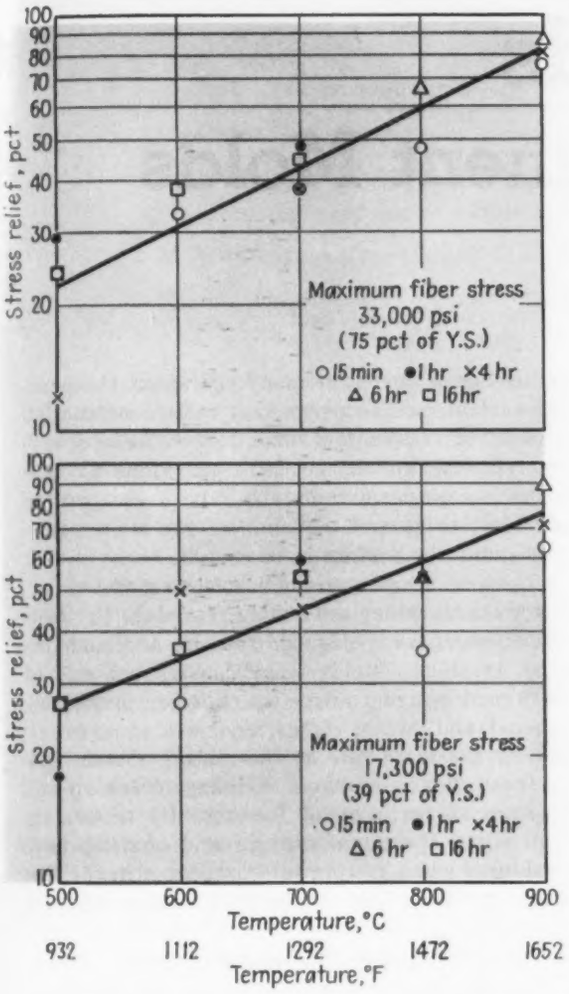


FIG. 4—Stress relief-temperature curves for type 347 stainless at both 39 and 75 pct of yield strength. Curves represent the general trend only.

out if the deflecting screw is slightly backed off. During the test, then, the maximum stresses are less than they would be if the fixed screw were tight; this is a source of error which is impossible to evaluate but which tends to give stress-relief values on the low side.

It was also observed from the D_s values that, as the testing progressed, the jig itself was creeping into a bow shape. The total creep, after completion of the tests, was considerable—about 0.15 in. on the low-stress end. This creep was absorbed by the stress-relief values, especially at the high temperatures, and would again make results more conservative, since creeping during testing would tend to lower the intensity of the stress in the beam.

In practice, stress relief is carried out by bringing the object up to temperature and cooling slowly. The fact that in these tests the jig and strips were inserted into a furnace at temperature and then air cooled would also tend to somewhat lower the observed stress-relief values.

From the data thus assembled, it was concluded that the amount of stress relief which can be accomplished in type 347 stainless steel is dependent more upon temperature than upon time. After one hour at temperature, very little further stress relief is effected by increased soaking time.

The percent stress relief obtained at any one temperature is approximately the same whether the material is stressed to a maximum of 75 pct of the yield strength or to a maximum of 39 pct of the yield strength. This means that, the higher the initial stress, the more rapid is the relief rate. After one hour at temperature, the material under consideration attains the following degrees of stress relief: 932°F, 25 pct; 1112°F, 35 pct; 1292°F, 45 pct; 1472°F, 60 pct; and 1652°F, 85 pct. These figures are probably not accurate to more than plus or minus 10 pct and tend to be lower than what might be expected in practice.

References

[1] L. W. Kempf and K. R. Van Horn, "Relief of Residual Stress in Some Aluminum Alloys," AIME Transactions, vol. 147 (1942) p. 250.

[2] H. W. Hiemke, "The Repair of Steel Castings," Journal of the American Society of Naval Engineers, vol. 48 (1936) p. 493.

New Metal Standards Released

THE Metal Powder Assn. announces the release of two new standards for the metal powder industry. One is a glossary of terms used in powder metallurgy: MPA Standard 9-50T—"Tentative Definitions of Terms Used in Powder Metallurgy."

The second standard is designated as MPA Standard 10-50T—"Tentative Standard Tension Test Specimens for Pressed and Sintered Metal Powders." This standard specifies a flat tension specimen and a round machined tension specimen to be used in determinations of the tensile characteristics of pressed and sintered metal powders used in powder metallurgy.

Detailed drawings of each specimen are given along with a list of apparatus required to make the specimens and recommended methods of die lubrication, compacting, sintering and testing. Both new standards are obtainable from the Metal Powder Assn., 420 Lexington Ave., New York 17, N. Y., at 25¢ per copy each.

New Methods
Produce Permanent Molds

By G. A. ROBINSON
Foundry Process Engineer,
Northrop Aircraft, Inc.,
Hawthorne, Calif.

CURRENT permanent mold construction methods of cutting or casting copper, iron or their alloys into molds or dies, mean tedious weeks of chipping, grinding and machining to develop the desired shapes and tolerances. Many foundries and machine shops have hoped for an easier way to accurately reproduce the surface of patterns so that parts could be in production within a few days.

Even after the permanent molds are completed, there is a high casting rejection rate due to shrinkage and porosity. Shrinkage cracking is generally caused by unequal cooling shrinkage between the permanent mold and the casting; the porosity is often due to air entrapment within the molten metal or caused by inadequate metal feeding. With both the high casting rejection rate and high cost of permanent mold construction, most foundries are compelled to use sand casting methods.

Because of these known fallacies in the present casting industries, a research program was instigated at Northrop Aircraft, Inc., to discover a low cost, fast and accurate method for producing castings which are free from shrinkage, cracks and porosity.

Preliminary investigations indicated that metal spraying procedures could be used to advantage in accurately reproducing patterns. The process consists of spraying metal onto a structure or pattern, then removing the sprayed metal shell with a suitable backing material to act as reinforcing. Metal spraying processes have been under development for many years, but the practical adaptation to permanent mold construction has only developed to a small degree. Metal spraying employs an oxyacetylene gas flame to melt either metal powder or wire, and a compressed air blast to atomize and impact the molten particles onto the surface to be coated.

Research investigations developed metal spraying methods which accurately reproduce patterns into permanent molds for ferrous and non-ferrous castings. Molds were constructed out of high melting point alloys which, when preheated, expand and, when cooled, contract at approximately the same rate as the casting metal. Use of these alloys eliminates shrinkage cracking and insures adequate metal feeding. By accurately controlling the metal melting and pouring temperatures when casting into preheated molds, the porosity within the casting was greatly reduced.

Cheaper Patterns Possible

The results of the investigation to date indicate that accurate reproductions of patterns can be quickly constructed at a marked reduction in cost. The exact cost figures can only be determined in production, as the time and expense depend upon the size and complexity of the pattern being reproduced. Permanent molds for small patterns up to 1.5 sq ft of surface may be reproduced by one man within two days. This construction period is exceedingly short when compared with machining operations now used for permanent molds, unless the patterns are very simple in form.

Sprayed metal molds and dies may be constructed of metal which develops a wearing surface of about 57 Rc and yet have a backing metal which can be easily machined. The procedures have been developed to a point where sprayed metal molds can be constructed which will withstand temperatures up to 2900°F.

In general, the term mold will be discussed. However, where a die is required for plastic forming, a similar method may be used. Molds or dies may be constructed by several processes, and the right process to use is determined by the complexity of the surface being reproduced.

Steel templates are designed and constructed into guide positions and plaster is faired in between the templates to within about ¼ in. of the

Low cost permanent molds are produced accurately and speedily through new methods using sprayed metals. Molds for small patterns up to 1.5 sq ft of surface may be produced in two days by one man. Sprayed metal molds have been produced that will withstand temperatures up to 2900°F.

upper surface. Some steel wool particles are distributed into the upper surface of the plaster and the development is allowed to dry. Surface of the plaster is coated with a heat-resistant waterproofing coating, and a bonding mixture is faired in to build the pattern to the desired contour. Fig. 1 shows the sequence of development.

This method may be reversed for more complicated shapes. For example, the bonding mixture may be spread in the bottom of a guide pattern coated with steel wool, dried, coated with waterproofing and then backed by plaster. After the plaster dries the guide pattern is removed, leaving the final pattern. Fig. 2 shows the development process.

The first coating of sprayed metal must be held in position on the pattern by a bonding force sufficient to resist the force of the air blast from the spray gun. It must also resist the expanding and shrinking stresses developed by the additional molten metal built up to produce the mold. Layers of sprayed metal deposited upon previously sprayed and cooled areas gradually builds up sufficient resistance to prevent all dimensional changes. Because of the difficulties in holding this first sprayed coating in position, special bonding mixtures were developed.

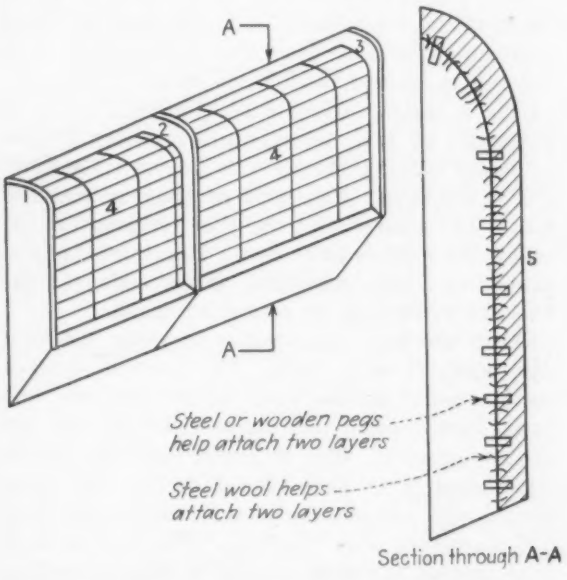


FIG. 1—Method for constructing a spray metal pattern of simple shape: 1, 2 and 3 are the steel templates; plaster, 4, is added below the upper surfaces of the templates; metal powder and binder, 5, are faired into outer edges of the templates.

These bonding coatings may be sheet metal for simple form patterns as shown in Fig. 3, or they may be metal powders mixed with a bonding agent such as the Northrop G20 type used as shown in Figs. 1 and 2. The requirement is

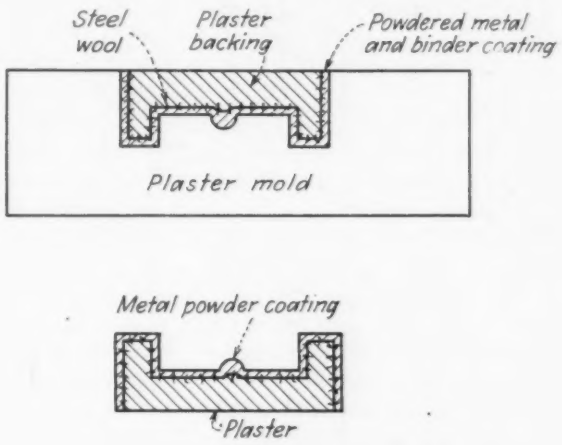


FIG. 2—Development process for constructing a sprayed-metal mold of more complicated shape. Steel wool is used to bind the two coatings. Lower photo shows pattern removed from mold, ready for metal spraying.

to obtain a metal which will soften slightly when the sprayed metal hits the surface and at the same time bond to the sprayed coating. Different bonding mixtures have been developed for the various metals sprayed.

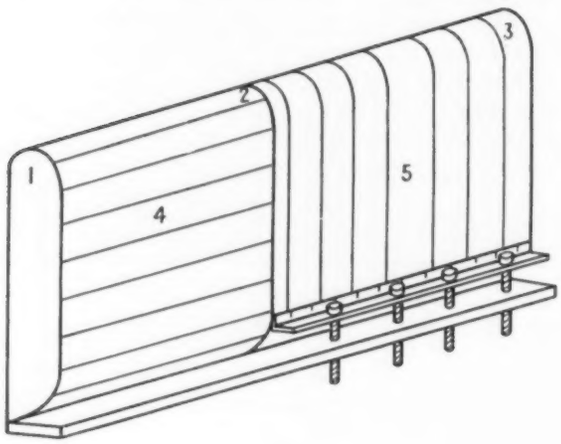
Some special edge bonding is required to prevent the sprayed metal from curling. On some patterns, an edge ring constructed out of bonding metal is fastened around the outer edge of the pattern having a thickness equal to the desired sprayed metal mold.

Gates and risers constructed out of bonding metal are added in proper positions for pouring castings into the finished mold. Seams between bonding metal sheets and other surface imperfections are filled in with bonding metal powder and binding of the Northrop G20 type to develop a smooth surface.

A metal coating about ¼ in. in thickness is then sprayed over the pattern. Care must be taken to atomize the metal to a fine texture when

starting the mold; after the surface is covered, the metal may be sprayed onto the pattern at a faster rate. In order to develop maximum bonding when starting spray coating, the spray gun is held about 6 in. from the pattern and moved over the surface at a rate of about 5 ips.

After the surface has been covered with sprayed metal, the gun is held about 12 in. from pattern to prevent overheating of the first thin coating. When coating starts to build up, the



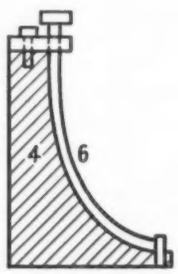


FIG. 3—Spray metal patterns may be constructed using bonding sheet metal. Steel templates, 1, 2 and 3; plaster faired between templates, 4; sheet metal stretched over templates and plaster, tightened by bolts, 5. Sheet metal may be held in compression for concave patterns, 6.

gun may be held from 6 to 8 in. from the surface. Care must be taken not to hold the gun in one position for more than 2 sec, or excessive expansion followed by shrinkage will pull the sprayed coating from the pattern. If cracking or pulling starts, the spot should be coated with G20 type bonding mixture and metal spraying continued.

After the sprayed coating has been built up to about ⅛ in. in thickness, reinforcing may be

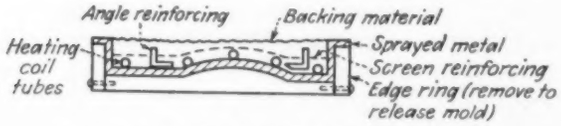


FIG. 4—Methods by which the sprayed metal is backed and reinforced.

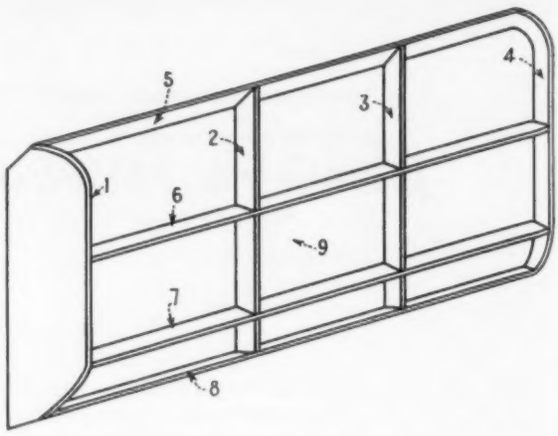


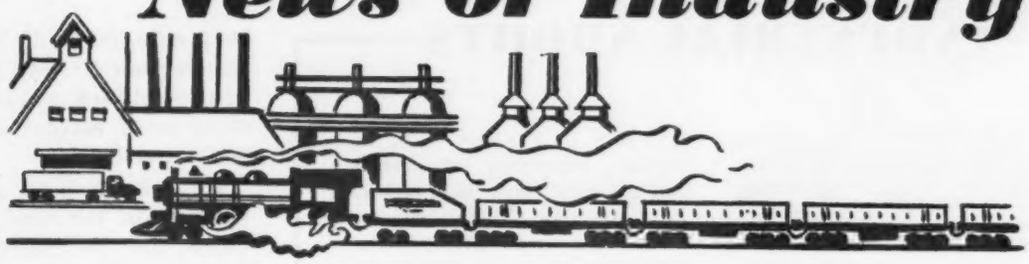
FIG. 5—Reinforcing the sprayed metal with sprayed metal ribs. Before starting the mold, form blocks 1, 4, 5 and 8 are constructed around pattern surface 9. Metal sprayed coating is then added over entire area for a supporting coating. Form blocks 6 and 7 are next fastened over the supporting coating to 1 and 4. Sprayed metal is then built up to desired thickness on one side of each block. Then blocks 6 and 7 are removed and blocks 2 and 3 added. A sprayed metal coating is built up on one side of these blocks and they are removed, leaving supporting ribs of sprayed metal.

added and spray bonded to the coating. This may be accomplished by several means, such as adding angles of bonding material or screens or wire as shown in Fig. 4. One of the best methods is adding a system of coated wood or bonding metal form blocks in the horizontal position, metal-spraying one side only to about ⅛ in. depth and removing the block. Then vertical form blocks are added and metal sprayed on one side only to about ⅛ in. depth and the blocks removed. See Fig. 5 for developed process.

Metal bonding paints are used to fill in joints between the form blocks and base coating before starting spraying. Once this rib work of reinforcing is started, additional sprayed metal develops a strong, durable reinforcing. Backing materials of high temperature-resisting plaster or lower melting metals may be used for additional strength. The type of backing material must be determined by the temperature at which the mold is to be used. Heating tubes and attaching angles may also be embedded in the backing to develop an operating mold.

After the mold construction methods had been developed, it was found that certain sprayed metals would expand and shrink with the cast metal and prevent shrinkage cracking and decrease porosity. For example, high chromium alloy steel wire sprayed into molds and preheated will prevent shrinkage cracking in Type 356 aluminum alloy castings. The process used is to preheat the mold to 1030°F, heat the molten 356 aluminum to about 1500°F to remove entrapped air, then decrease to about 1350°F before pouring. Some research was conducted in casting the aluminum in an inert atmosphere, which helped produce a bright clean casting.

News of Industry



A Pat Instead of Dagger

New York—A pat on the back for the steel industry came from an unexpected quarter last week—from the executive of a steel fabricating firm as short on steel as anyone else.

Speaking before a press luncheon at the University Club here, Sheldon Coleman, executive vice-president of the Coleman Co., Wichita, Kan., complimented steel for its foresight in planning expansion when the rest of industry was busy crying "recession." He said that the many criticisms of steel were unfair and applauded the industry for record-breaking output.

U. S. Plans 50 New Cargo Ships

Washington—Construction of 50 new-design fast merchant ships to meet war needs is planned by the Maritime Administration. Korean shipping requirements have depleted the number of high speed ships available in laid up fleets.

Details of speed and size of the new ships are not yet available. The new program will aid shipyards which at present have only 23 ocean-going vessels building.

New Continuous Casting Firm

New York—Allegheny Ludlum Steel Corp. has obtained a 35 pct interest in Continuous Metalcast Corp. American Metal Co., Ltd., and Scovill Mfg. Co. have each acquired 10 pct ownership in the new firm which holds rights to the Rossi-Junghans continuous casting process (THE IRON AGE, Aug. 19, 1948, p. 72). Irving Rossi, owner of the process, holds the remaining 45 pct.

Pipelines Need 6 Million Tons of Steel

Planned and under way are 25,000 more miles of pipelines . . . Steel needs challenge industry . . . Natural gas line demands are highest at 5,190,880 tons—*By Gene Beaudet.*

Chicago—The long, pressure-operated pipeline is the fastest gaining medium of transportation in the world today. At the present time there are approximately 160,000 miles of pipelines carrying crude and refined petroleum products and 260,000 miles of natural gas pipelines in operation. Throughout the last 15 years builders of pipelines have hardly been able to keep up with the demand. Oil tonnages carried by pipelines have been doubling every 4 to 9 years.

Record Year Seen

Pipelines are still growing. All indications point to a record-breaking year for pipeline construction in 1950. At present there are underway or planned more than 25,000 miles of crude, domestic oil product and gas pipelines. This staggering figure will require approximately 6 million net tons of steel. When and where the pipelines will be able to get the steel to carry out these projects is a challenge to the steelmaking capacity of the country.

Of the total pipeline mileage to be constructed, about 3800 miles are for crude oil, 1900 miles are for domestic oil products, and 19,700 miles are for natural gas lines. These figures reveal that at the present time the pipelines for natural gas, which now supply one-seventh of the energy produced in the country, are undergoing the greatest amount of construction. Beside domestic uses, industry has found over 20,000 applications for natural gas. The great rush of new consumers over the last several years is understandable because natural gas is the cheapest, cleanest, and most convenient of the three basic fuels.

One of the largest natural gas projects now underway is the Transcontinental Gas Pipe Line Corp.'s 30-in. line running from the Rio Grande Valley to New York City. The first delivery is expected in December. Gas will be delivered from 34 different fields extending along 600 miles of the Texas-Louisiana Gulf Coast. The company has more than 50 trillion cu ft of natural gas in its supply area. Its capacity will be 505 million cu ft per day.

Wyoming to Illinois

In the petroleum field, plans for the construction of one of the largest crude oil pipeline projects since the war have been recently completed. This 20-in. line, extending from the Worland area of Wyoming to the Wood River refinery area in Illinois, will have an initial delivery capacity of 70,000 bbl daily. The cost of constructing the line is estimated at $60 million.

The major foreign crude oil project now underway is the Trans-Arabian Pipe Line Co.'s

INDUSTRIAL SHORTS

BUYS PATENTS—The patents, name and technical data of the Turbodyne Corp., Hawthorn, Calif., a Northrup Aircraft, Inc., research subsidiary, has been purchased by the GENERAL ELECTRIC CO., Schenectady. The Turbodyne Corp. has developed a turboprop aircraft engine believed to be the most powerful propeller-type aircraft power plant in the world.

TRIPLES CAPACITY—A $2½ million expansion program now under way will increase the productive space and capacity of the Los Angeles plant of McCULLOCH MOTORS CORP. by 300 pct. The increased facilities will triple the magnesium and aluminum diecasting capacity, add an entirely new heat-treating department, and expand the present gearmaking, grinding, machining and assembly output.

SAFETY WINNER — With an accident frequency rate of 1.58 as compared to the average of 5.35 for all industry, COPPERWELD STEEL CO., Glassport, Pa., finished first in the National Safety Council contest, Nonferrous Metals Division.

NEW EUROPEAN PLANT — A new and enlarged plant has been opened by LAPOINTE MACHINE TOOL CO., LTD., Bushey, Hertfordshire, England. The company manufactures broaching machines and broaches.

MAKING SILICONS — Silicons will now be manufactured in England by the joint effort of DOW CORNING CORP., Midland, Mich., and ALBRIGHT & WILSON, LTD., Oldbury, Birmingham. A&W are designing a manufacturing plant, using Dow Corning know-how and engineering assistance, which will eventually produce the complete line of silicons developed by Dow Corning in the United States.

ENTERS BUSINESS — J. E. Cooper, supervisor of special and sanitary plant engineering, Ford Motor Co., Detroit, has resigned to enter private business. He will be associated with F. W. DuBois in a sales engineering organization, DUBOIS-COOPER ASSOCIATES at 15760 James Couzens Highway, Detroit.

ACQUISITION—COLUMBUS-McKINNON CHAIN CORP., Tonawanda, N. Y., plans to acquire the Dixon Chain Mfg. Co., Inc., Dixon, Ill.

WORLDWIDE MARKETS — BUCKEYE TOOLS CORP., Dayton, manufacturers of portable air and electric tools, has signed contracts with Joy Mfg. Co., Pittsburgh, and Joy Mfg. Co. (Canada) Ltd., Ontario, covering sales and service on Buckeye portable air tools in export markets.

CLEVELAND BRANCH — A $250,000 branch warehouse and office building will be constructed in Cleveland by the MINNESOTA MINING & MFG. CO., St. Paul. It will be located on Elmwood Ave. near W. 117th St.

REPRESENTATIVE — Worth Steel Co., Claymont, Del, has appointed A. M. CASTLE & CO., Chicago, a representative for their flanger products including carbon steel heads, solid stainless heads, and stainless clad heads and plates.

OVERSEAS OUTLET — A branch office of ELECTRIC EQUIPMENT CO., division of Norry Electric Corp., Rochester, is being established in Israel and some consideration is being given to a contact in France.

SALES AGENT—The De Laval Steam Turbine Co., Trenton, N. J., has appointed the R. M. SORLIE CO., Kalamazoo, Mich., as a sales representative in the western half of the lower part of Michigan.

1067 mile, 30 to 31-in. line from the Persian Gulf to Sidon, Lebanon. Steel tonnage needed to complete it is estimated at around 34,400 net tons.

In attempting to arrive at an estimate of the steel tonnage required for the pipelines in this country already underway or planned, tonnage had to be calculated on the theoretical weights of the size of the pipe for the mileage set forth in each line.

Steel Tonnages Needed

Recently-published tables prepared by the *Oil and Country Journal* show that calculated steel tonnages required for pipelines planned and underway are 639,864 net tons for domestic crude oil; 212,723 for principal domestic product lines; and 5,190,880 for principal natural gas lines.

Because of the increasing steel shortage, the oil and gas companies and the pipe and steel producers are wary about giving out any information concerning the actual tonnage required for each line. This is understandable on the part of the oil and gas companies because of competitive reasons and with the steel and pipe producers because they do not want tonnages allocated to each customer to become widely-known.

With all consumers seeking to increase their allotments, any knowledge of another company's allotments could be used as a point in an argument to get more steel.

Pipe on Allocation

All companies are on allocation to consumers and are booked to capacity. Orders taken are based on a record of previous history with the company. One large producer is sold out on all linepipe throughout 1952 and another is sold out through 1951 on pipe sizes ranging from 8⅝ in. to 26-in. diam.

Fabricators of large diameter pipe have to gage their production on the incoming supply of plates. They have in some cases been forced to pay conversion and

premium prices for it. One fabricator reports being cut back 25 to 30 pct on its plate allocation and is going to cut back its production proportionately in October. As a result, some pipeline projects will be slowed down. Reasons for the cutback given them are the need for spreading plate tonnages around to more consumers, and increasing defense requirements.

According to pipe producers, even greater than the need for linepipe is the demand for casing and drill pipe.

Some quarters point out that the additional capacity of large diameter pipe brought about by the mills built in the last few years has not enabled supply to catch up with demand. These mills were built on the basis of prior orders and are sold out far ahead on a contractural basis.

In addition, the large pipeline projects built with the pipe from these mills has added to the increasing demand because they result in a demand for smaller sizes of pipe used in lateral lines coming off these big projects. They have also resulted in a greater demand for steel needed in compressors, booster stations, storage tanks and auxiliary equipment.

Fatality Starts Overloaded Trucks Trouble

Carnegie-Illinois restricts steel shipments to legal load . . . Truckers argue that they'll starve . . . If other mills follow Carnegie, truckers may snub Pennsylvania hauling.

Pittsburgh—A fatal accident involving a truck hauling an overload of steel may force a showdown on whether weight laws can be strictly enforced when shipping space is at a premium and the country is on the brink of a national emergency.

As a result of the accident, which involved a truck loaded at the Irvin works of Carnegie-Illinois Steel Corp., the steel company has instructed its shipping departments in Pennsylvania not to load trucks in excess of the legal limit, which means that in the case of the most commonly-used combination of truck tractor and semi-trailer, the steel and rig together can weigh no more than 45,000 lb. This order may be extended to other plants of the company.

Carnegie-Illinois' action poses a problem for the truckers, who have repeatedly contended that they would starve to death on payloads within the legal limit. If other steel producers follow suit, it is conceivable that the haulers may lose interest in Pennsylvania business. Carnegie-Illinois already is finding it more difficult to obtain trucks.

To a suggestion that their rates be increased, the truckers reply that if they are to stay within the legal weight limit they would have to double their rates to compensate. Even if this were workable, they say, almost double the number of trucks would be required to haul the same amount of steel, compounding the traffic congestion problem in the State.

"Good news, Miss Bilikens! Next week we're being assigned a larger office."

Trucks are more in demand now than at any time since the end of World War II. The reasons: (1) The freight car shortage, (2) high rate of steel production, (3) inventories of most steel consumers are low, and many are specifying shipment by truck for faster delivery, and (4) some steel producers will prefer trucking when possible because of the Interstate Commerce Commission's Oct. 4 order increasing demurrage charges on freight cars.

A steel traffic man recalled that during the war the government permitted truckers to load in excess of State weight limits, which were generally winked at. In fact, it was revealed recently that under a special ruling of the Internal Revenue Bureau truckers were permitted to deduct for income tax purposes any fines imposed for violation of weight laws. There is some speculation that if shipping space gets any tighter, the States may be forced to declare another moratorium on their weight laws.

Enforcement More Stringent

Since the recent fatal accident, however, enforcement of the weight law in Pennsylvania has become more stringent, particularly in the immediate Pittsburgh district. Safety Director George E. A. Fairley, of Pittsburgh, is talking of putting two scale crews to work to weigh suspected trucks within the city. Heretofore, Pennsylvania State Police weighing details was the only law-enforcement agency checking weights.

The accident pinpointed the question of whether it is up to the steel producers to "police" the weight of trucks leaving their plants. The mills argue that this is not within their province and contend that when a rig pulls into the shipping platform, they can only comply with instructions of the hauler, who should know, they say, whether the load is unsafe, and whether it exceeds the lawful

weight limit. Also, a truck might pull out of one plant with a legal load, then pick up another down the street.

This point was emphasized by the mills at a meeting with the ICC a year ago this month, at which the truckers agreed informally that trucks would not be loaded beyond safety limits. The ICC at that time gave the impression that if the arrangement did not work out formal controls would be imposed.

Damage Suit Pending

Ralph T. Bell, attorney for the family of Richard Shiffler, young college student killed in the accident, has announced that barring a settlement of the case, Carnegie-Illinois will be one of three defendants in a damage suit he intends to file within the next month. The other defendants, he said, would be the Brannon Trucking Co. and Aetna Freight Lines, Inc.

The truck driver, Anthony Baldassare, 23, was held by a coroner's jury for grand jury action on a charge of manslaughter, leading Local 249 of the AFL teamsters' union to announce that they will insist on strict enforcement of those sections of their contracts prohibiting truckers from asking drivers to break the law.

Expand Little Rock Lamp Plant

Pittsburgh—Construction of a 100,000 sq ft wing will be started soon at the Little Rock, Ark., lamp plant of Westinghouse Electric Corp., Ralph C. Stuart, vice-president, has announced. The addition, 200 ft by 516 ft, is scheduled to be completed next April.

Borden Builds Plant in Leeds

Birmingham — Borden Metal Products is building a new plant at Leeds, Ala. To begin production in January, the plant will have 20,000 sq ft of floor space on a 30-acre site. Machinery has already been purchased and will be installed when the building is completed.

Renaissance of Steel in South America

Cost-hampered steel industry grows in recent years . . . Governments must finance and shield . . . Lull in steel dumping helps . . . Brazil in lead—*By Ted Metaxas.*

New York—Steelmaking in South America is not a new venture but the piddling extent of prewar operations lends the stature of an industrial renaissance to current building and expansion. With Brazil in the vanguard, South American countries are trying to alter their role as almost complete dependents on steel imports.

Cutthroat Competition

Their vitalized steel industries are still swimming against the stream and need the nurturing of government support. An expansion stimulus is a lull in the wholesale dumping of foreign steel. Now is the opportune time for growth while the world hungers for steel. Previously steelmaking had been hobbled by cost flaws inherent in its production structure—lack of raw materials and skilled labor, and the depressive effect of small undeveloped local markets.

An example of what foreign competition can do to South American steelmaking unless government shields continue is the dumping of Belgium and German steel in Venezuela last summer at ruinous prices. With its 25,000 ton capacity, the Venezuelan Steel Corp., at Caracas, was forced to close in June and reopened only after it appealed successfully to the government for a guaranteed price on reinforcing bars, its sole product.

Volta Redonda Mill

Brazil's Volta Redonda mill is the titan of South American steelmaking. On July 22, the Export-Import Bank approved an additional $25 million loan to Companhia Siderurgica Nacional to expand the mill. Annual steel capacity will rise to 662,000 metric tons. Planned is a new blast furnace to produce 2180 metric tons of pig iron daily. Rolled steel capacity will jump to 467,000 tons. With expansion of other mills, the country's total rolled steel capacity will be about 700,000 tons.

Brazil is rapidly becoming self-sufficient in iron and steel. In 1940 rolled steel output was 135,000 tons; total steel, 141,200; and pig iron, 185,570 tons. The rise was meteoric, especially when the production weight of Volta Redonda was felt in 1946. Pig iron production gains lead all other products. January to March output of 163,334 tons was a 110 pct increase over the same '49 period. Brazil's coking coal must be imported and steel costs cannot be easily dislodged from a level 30 pct over imported steel. The industry's fortress is import duty and a complex export licensing system.

Second Largest Mill

Built by the Corporacion de Fomento de la Producion with Chilean funds and $48 million from the Export-Import Bank, Chile's $90 million works at Huachipato is the second largest integrated mill in South America. It produces 203,000 metric tons of pig iron, 236,400 tons of ingots, and 120,730 metric tons of billets. As originally designed, finished products output is 158,830 metric tons.

Both Chilean and U.S. coal is being used and iron ore is shipped from northern Chile's Bethlehem Chile Iron Mines Co. Limestone comes from Guarello Island, off the southern coast of Chile. Already the mill has stated that it was in a position to export about 50,000 tons of finished steel but its preference lies in dealing with neighboring countries rather than in trying to crack the U.S. market. By U.S. standards Chilean steel is expensive and ocean freight charges run $17 per ton.

Colombia is entering the steel picture by building its Paz de Rio

integrated steel mill, at Boyaca at a cost of $60 million, $25 million of which was loaned by a French bank and the balance by private industry. Coke, coal, and limestone are on location and the mill's 100,000 tons a year capacity will be in reinforcing bars, merchant shapes, and structurals.

Argentina is relatively barren of most steelmaking materials and its iron ore resources remain mostly unexploited. Private steel companies must import all their raw materials and consequently the capacity of the country's industry is estimated at only 300,000 metric tons a year. Now in the tentative planning stage are two new plants for the production of pipe and wire.

Government Financing

Any expansion has been and will be largely financed by the government. Argentina's first blast furnace was built at Government urging and signing of a share-profit contract with the Province of Jujuy. Private industry has regarded iron ore exploitation as far too expensive.

The Argentine Mixed Steel Co. was established in March 1948 as a State enterprise bringing together the major metal companies. A 4 pct minimum profit on investment is guaranteed but Argentina had to provide 80 pct of the funds. Industry gave only 10 pct. A smelter and rolling mills will be constructed with the help of Armco International Corp. and Armco Argentina, S.A. The mills are to have 250,000 tons rolling capacity.

In a country where the pampas teem with beef, a canning industry is vital. Thus the planned mills will produce tinplate. Tin concentrates will arrive from Bolivia. Military steel mills are government-supported and pay scant attention to economic barriers to production. These mills are the first to use local iron ore and have been expanding, producing some industrial goods.

New Gas Process

Venezuela is vague with her expansion plans. The industry consists practically of the Venezuelan Steel Corp. It is reported that the government is interested in constructing a steel mill and that studies are now being made by the Salem Engineering Co. Since Venezuela is handicapped by the absence of coal, it is weighing a "new process" using natural gas.

South American steel needs have been filled partly by U. S. mills. In normal times this export business was welcome but now that steel is in shortage in the U.S., South American demands are a drain. Financed and protected by government, South American steel has been shoved upward and it is possible in the years to come that despite handicaps of high steelmaking costs, the industry will at least be able to supply local needs.

Congress Lifts Import Duties On Ferrous and Nonferrous Scrap

Washington — Import duties on ferrous and nonferrous scrap are slated for suspension next month.

The duties were suspended during World War II, but became effective again July 1, 1949. The new exemption extends through June 30, 1951.

The Senate beat down an attempt to suspend import duties on copper in the same bill. Copper imports have been taxed since July 1 at the usual rate of 2¢ per lb, but Senate leaders announced they would make a new attempt to suspend the duty at the "lame duck" session of Congress in November.

SKF Plans Addition to Plant

Philadelphia — Construction of 40,000 sq ft of additional floor space by SKF Industries, Inc., will be started soon, according to John Lawrence, vice-president. The SKF plant is operating on a 48 hour week with some departments working three shifts 7 days a week.

Colorado Fuel & Iron Buys Tract

Buffalo—Purchase of a 175 acre tract adjoining the Wickwire Spencer Steel plant, a division of Colorado Fuel & Iron Co., has been announced. The acreage will permit the company to meet future expansion needs.

BRIGHT SPAN: An aluminum highway bridge, reportedly the first ever built, spans a river at Arvida, Quebec. It was built entirely of Alcan 26ST aluminum alloy by the Dominion Bridge Co. and weighs about ½ million lb less than a steel bridge its size. Savings in handling and freight charges are claimed.

Laborites to Split British Steel with Nationalization Law

Attlee gains victory with six votes . . . Greenhorns on board.

London—The political dreamer after Utopia has won over the hard-headed industrialist in England. Steel has been split in two by the Labor Party's decision to nationalize the major part of the steel industry under the Iron and Steel Act this January. Prime Minister Attlee rode to victory last week on the rickety platform of six scant votes.

Greenhorns in Steel

Uninformed sources had been echoing till the last minute the trite line that the Laborites would elude the steel issue until the latest possible date in January 1952. Laborites staked the success of their political ideology on the turn of a vote last week and emerged bedraggled victors. Their success will put under government control all but 400 steel firms which will remain under the representation of the Steel House.

The Steel Corp. to administer nationalized steel will consist of few steel men. Winston Churchill criticized them as greenhorns in a complex field. "Pockets of resistance", firms not encompassed by the law, will exist in the nationalized structure and private enterprise will still be in part responsible for most finished and semi-finished processes.

Nationalized steel will include 68 pct of alloy bar production; 23 pct of steel castings; 45 pct of steel forgings, 49 pct of wire, 60 pct of steel tubing; 22 pct of iron castings, 24 pct of bright steel bars; and 5 pct of bolts and nuts.

Higher prices for British steel are forecast as a natural consequence of nationalization. Fears are expressed that the new system will make production more expensive and less efficient. Accusing Prime Minister Attlee of placing party policy above national welfare, Mr. Churchill warned that nationalization would dislocate the industry at a time when it was needed for armaments.

Coming: Union Shop Vote

Pittsburgh — The largest National Labor Relations Board vote in the history of the steel industry may be held sometime within the next 2 months.

The United Steel workers of America (CIO) is petitioning for "union shop" elections covering 650,000 workers in basic steel. The elections will be held between Nov. 1 and Nov. 30, beginning with U. S. Steel Corp. However, the NLRB may elect to vote all the steel workers at the same time.

The steel companies are going along with the union's petition, and the elections will be held on company property, according to Phil Murray, USW president.

Kropp Has $5 Million Backlog

Chicago—Roy A. Kropp, president of Kropp Forge Co., reports a Sept. 15 order backlog of $5 million, equivalent to 80 pct of 1949 total volume. Forged tank gears, jet engine shafts and other defense items make up 25 pct of current production and by the end of 1950 50 pct of all work will be on defense orders.

"They're ruined! The wife wore them to do some gardening over the weekend."

NPA Establishes Inventory Controls on Honor System Basis

Industry seems to expect more . . . Inventories too low for violation.

Washington—Industrial skepticism over the potency of the National Production Authority's Reg. 1 order establishing inventory control (THE IRON AGE, Sept. 21, p. 114) seems to stem from the expectancy of industry for tighter controls than the NPA is ready to institute.

A high official of the NPA told THE IRON AGE that the inventory order was "a code of honor", giving business a "chance to say what's reasonable within the spirit of the order". As the defense program picks up production momentum, additional items will be added to the roster, but it is hoped to keep strict limitations out of Reg. 1 if industry maintains normal buying.

Steelmen and fabricators have been scratching heads over a vague phrase in Reg. 1—"inventories must be held to a practicable working minimum." This is open to individual interpretation but there is little chance of gross violation as loosely-worded as it is since most steel consumers buy on practically a hand-to-mouth basis.

Voluntary Allocation

Steel producers, trying to hold the gates against steel-short consumers, have of necessity established their own allocation system. They are not permitting customers to build inventories large enough to violate Reg. 1. Some nonferrous metals are also being allocated.

The "invisible inventory" will remain untouched by Reg. 1. The powerful firm can still be assured of a steady supply of steel if mills will hold material for them in the mill warehouses.

Spot enforcement checks will be made when NPA gets ready to set up an enforcement or compliance division. If hoarders are discovered their stocks may be requisitioned, they may be subject to the general penalty provision of the defense production act which calls for a maximum $10,000 fine or one year in jail or both.

Signode's Search for Site Leads to Branch in East

Dundalk, Md. — A new industry was placed strategically within its Atlantic Seaboard market on a 30-acre tract in this suburb of Baltimore by the Signode Steel Strapping Co., Chicago. Search for a site was started by Signode when it started to think of postwar expansion.

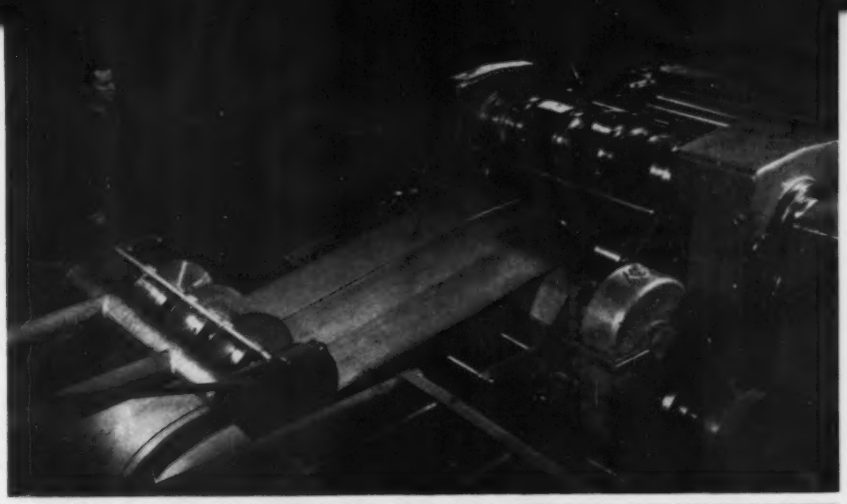
It considered its eastern customers who could be served more economically by an eastern plant. It considered its need for better facilities to meet export demands. Then it added on another factor—the firm's hot-rolled strip was supplied in the main by eastern producers.

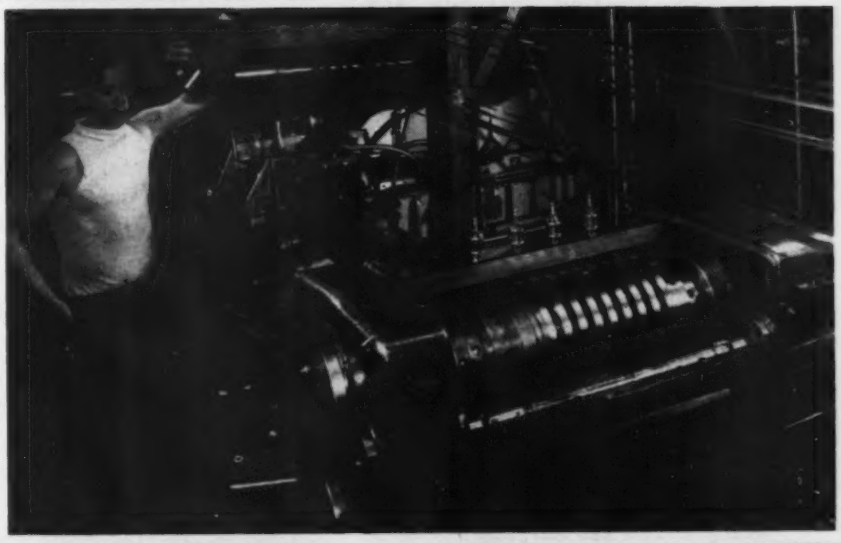
The new Signode plant is within minimum rail shipping distances to the heavy industries market in central Ohio and Pennsylvania and has a direct waterborne route to West Coast and foreign customers. In its 49,000 sq ft one-story plant, Signode can produce 3750 tons of steel strapping a month in five different widths and eight different gages. Some of Signode's eastern clients are receiving government contracts and to meet their demand. Signode plans another shift.

Freight cars cart into one end of the plant hot-rolled steel coils weighing up to 7½ tons which are unloaded by two 10-ton cranes. Onward to the splitting mill with its three disc blades, the 37½ in. coils are sheared into strips for rolling.

On the plant's United reversing mill, the coils are rolled down from 0.097 in. to thicknesses as low as 0.010 in. The reduced and narrowed coils go from the mill to the slitting line. They are fed by automatic coil buggies and are lead tempered and coated.

The steel ribbons run onto spools at the end of the slitting line for rewinding into coils weighing 100 lb. Fork lift trucks then take pallets of coils to trucks or waiting freight cars. Storage is not much of a problem at Dundalk.





1. **SHEARING:** Splitting mill blades shear strip to correct rolling width.

2. **REDUCING GAGE:** Coils are rolled down to as low as 0.010 in. on the reversing mill.

3. **RIBBON STEEL:** The slitting line narrows the coils to ribbons of steel which are lead tempered and coated. In the photograph the slitting operation begins.

4. **REWINDING:** Strapping is rewound into coils weighing 100 lb.

New England Council Weighs Proposal for Lean Labor Years

Quickened industrial activity lowers skilled labor surplus in area.

Poland Springs, Me.—Preparations for the lean years ahead in the labor field were discussed by the New England Council's industrial committee here recently. Moving to meet more acute labor shortages in the offing, Arthur C. Gernes, regional director of the Bureau of Employment Security, Dept. of Labor, suggested that industry assess its manpower needs and start apprentice and in-plant training programs.

He predicted that a fuller impact of war production on regional employment would fall in November or December and that the sharp climb in employment would be braked slightly by controls on basic materials.

With general industrial activity in New England taking the downward path in recent years, employment agencies until recently were wearing sackcloth and ashes, reporting surpluses of almost every skill in labor.

Surplus Wiped Out

The Korean War had repercussions in New England and accomplished a transformation from too much to too little. A subtle migration of skilled workers responding to the wage and job lures of out-of-the-area firms coupled to instant demand of local firms gearing for war motivated a dissimilar complaint from employment agencies.

Now they have difficulty in finding machinists and machine operators. The sad surplus has been wiped out. From 30 to 40 pct more inquiries for skilled help were pouring into New England than before the war and local firms began to worry about holding their own.

New England papers early in September carried job ads for skilled workers from the Boeing Aircraft Co., Seattle—a continent away. A California aircraft firm started to drain skilled men from Providence, which a short time ago had humbly admitted its "distressed employment area" classification suddenly was dumfounded to discover that it was reaching "a stage of desperation" in the labor shortage.

Industralists in New England expect defense spending to mushroom and are taking steps to meet its full brunt by planning building and expansion projects costing more than $44 million, disclosed a regional business survey held before a recent meeting of the New England Council.

New England manufacturers were awarded defense contracts topping $20 million for the 2-week period ending Sept. 5, raising the total to $31,567,515 since mid-July. Consistent with the government's wool stockpiling intentions and quickening draft program were $12,887,850 worth of orders for wool serge.

Murray Plays Wage Rise Overture for Steel

Wage boosts expected before contract ends . . . Personnel man sees hike as inevitable . . . Steel prices may be forced up to compensate for increases—*By John Delaney.*

Pittsburgh—Pressure for higher wages has caught up with the steel industry—officially. At the request of Phil Murray, president of the United Steelworkers of America (CIO), steel companies will get together with the union on wages, Oct. 9.

This is well in advance of the date required by the contract, and the probabilities are that an agreement will be reached before contract expiration dates of Dec. 31 or one month later in the case of a few companies.

As the personnel director of a leading producer put it, "There is no question that the steel workers will get a wage increase, and I wouldn't be surprised if it came in advance of the expiration of the contracts."

Pass the Ammunition

Guesses on how much the steel workers would ask for ranged from here to there—as high as 23¢ an hour. If it is that much, and the industry capitulates, the chances are good that steel prices will be increased to compensate. Other costs of operation have been increasing, too. Mr. Murray didn't say what he has in mind and won't until he meets with his wage policy committee here on Oct. 4 to 5. At that time, he said, he expects to have all his "ammunition" ready to fire at the industry. The bulk of it will touch on industry profits. *Steel Labor*, the USW's official publication, carried a front-page graph and tabulation of second quarter earnings in its September issue.

Aluminum Co. of America's offer of a 10 pct increase to become effective the first payroll week in October was a shock to some steel executives. They immediately related it to the average hourly pay of the steel workers—$1.70—and came up with 17¢. They were thinking in terms of a lesser amount. If accepted, the Alcoa offer would go into effect nearly 2 months before the Nov. 30 date stipulated in the contract for reopening of the 2-year agreement on the issue of wages. What a 10 pct increase would mean in cents per hour for the average worker, Alcoa would not say. The existing average hourly rate for the industry is not available. Salaried employees of Alcoa will receive comparable increases.

Mr. Murray's announcement last week that he was asking the industry to an early meeting to negotiate "a general and uniform change in rates of pay" was not exactly world-shaking. He, too, is under pressure —from his members. They have not had a pay boost since the average

increase of 13¢ an hour in 1948, and their fellow CIO members in the United Automobile Workers already have received theirs.

Besides, the president of the CIO and USW already has had some preliminary discussions with U. S. Steel on wages (THE IRON AGE, Sept. 21, 1950, p. 105).

Mr. Murray was quietly confident when he announced after the first day of a 2-day meeting of his executive board last week that he was sending identical letters to the presidents of 1400 basic steel companies and fabricators requesting the Oct. 9 meeting.

Someone asked whether he felt the industry would go along with his request that in the national interest a mutually satisfactory agreement be reached at the earliest possible date. Mr. Murray replied, in effect, that "it's in the bag."

"We hope to expedite disposition of this problem," he said. "It is always possible that these things can be worked out rather speedily."

Impending Labor Shortages

Asked what he meant by "the national interest," he replied that he was thinking of (1) the needs of the steel workers, (2) that the nation at present is going through a period of national mobilization and that there is no doubt that within the next few months we will begin to feel a shortage of manpower, particularly in those industries that have not settled on wage increases with their unions, and (3) manufacturing must be maintained at the highest possible level during national emergency.

The union leader said he was aware that the steel companies are not required under the contracts to meet with him until after Nov. 1. If the companies decline his invitation, he said, he will nevertheless abide by "the letter of the contract."

The Alcoa offer would cover some 40,000 hourly-paid employees in 23 plants. Of these, approximately 21,000 in nine plants are represented by the USW. Mr. Murray met with union leaders from the nine Alcoa plants last Saturday.

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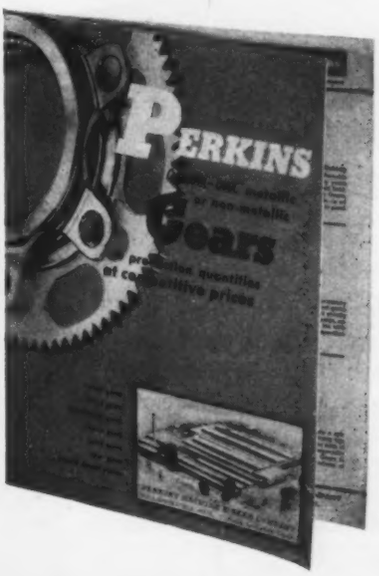

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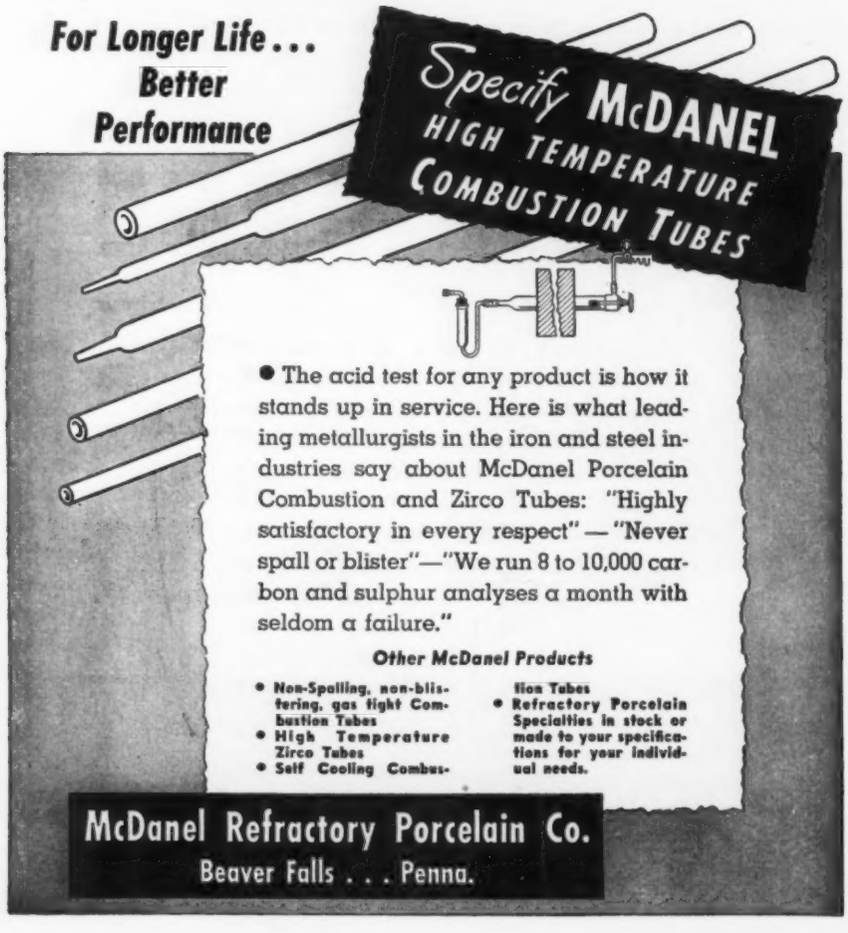

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Trucker's Trailer Bed System Would Combine Truck, Rail Hauls

Warren, Ohio — Newly-designed trailer beds will permit combined truck and rail freighting of steel and take the two transportation mediums out of the deadly enemy class by assigning short hauls to truckers and long hauls to the roads.

Developed and patented by J. Phil Fellabaum, president of Aetna Freight Lines, Inc., one of Ohio's major steel truckers, the trailer beds can be lifted onto a railroad flat car or a loading dock. Railroads are reportedly interested since it might regain for them some of the freight business that has been taken by truckers.

Mr. Fellabaum notes that great transit economies could be effected through lower warehousing costs, fewer returns of empties, and less railroad car demurrage. He contends truckers losses of long hauls would be offset by increased short hauls.

Has 13,611 Freight Car Backlog

New York—The 13,611 freight car backlog, as of Sept. 15, of the American Car & Foundry Co. is the largest since April, 1949, according to Charles J. Hardy, chairman of the board.

Major orders include 1500 box and 2000 gondolas for Pennsylvania, 2000 hopper cars for Chesapeake & Ohio, 1000 box cars for Union Pacific, 1000 tank cars for Union Tank Car Co., 1000 box cars for Baltimore & Ohio and 800 gondolas for Santa Fe.

Inland Operates New Coke Ovens

Chicago—A new battery of 65 coke ovens has been put into operation by Inland Steel Co. at its Indiana Harbor, Ind., plant. This will enable the company to raise its coke making capacity 200 tons per day. The new battery will replace one built in 1914 which is being taken out of operation for rebuilding. When the old battery is withdrawn the plant will have a total of 414 ovens operating.

Congress Moves to Protect Industry from Enemy Sabotage

Washington — The government moved on two fronts last week to protect industry from Communist sabotage as a Presidential veto was overridden.

Congress gave overwhelming approval to legislation requiring registration of Communists, including stiff penalties for persons concealing Communist membership while employed in defense plants or while seeking employment in defense work.

"Defense work," under the bill, means employment at any plant, factory, airport, vessel, pier, waterfront facility, mine, railroad, public utility, laboratory, or station engaged in service or production for defense.

NSRB Urges Self-Defense

The National Security Resources Board urged industry to adopt a well-organized system of "extended self-defense." The primary responsibility for plant protection rests upon the owners and operators under the principle of organized self-protection, NSRB said. In addition to adopting measures against sabotage, the board recommended plant safety programs, warning systems, shelters, fire-fighting equipment, medical facilities, rescue teams, exit and entry control and blackout techniques.

The Munitions Board has already (THE IRON AGE, Sept. 7, p. 123) issued suggestions covering security of information, sabotage, fire protection, and accident prevention.

Ford Plans $600 Million Program

Detroit—A multi-million dollar expansion program was announced here recently by Ernest R. Breech, executive vice-president of Ford. Remarking that Ford production was 50 pct over the prewar level, Mr. Breech said that Ford will spend $600 million for plants, facilities, and equipment during the next 10 years. About $300 million is being spent on current projects.

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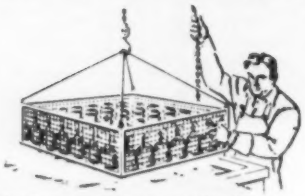

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The Unichrome Dip Process – a chemical treatment – brightens zinc plate to chromium-like luster and protects it from dulling. Also used to chromate-treat zinc die castings. It provides both *economy* and *quality* in finishing wire goods, screws, nuts, bolts, and a variety of other products.

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Unichrome Plastisol and Organosol Compounds, "4000 Series," possess a set of properties seldom found in one material. (1) They have the greater resistance of the vinyls to chemicals, oils, water. (2) This resistance is further increased by the thick coatings – up to 3/16" – that they produce. (3) And because they have flexibility, they withstand mechanical damage as well. (4) They are applied by dipping or spraying, and then baked.

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Plan Limited Priority List

Washington — Latest word on the control outlook from the National Production Authority is that an order giving priority to military orders for certain critical commodities will be issued by the end of this week. However, there is still no word on when an allocations program for steel and other materials will be set up. At best, it will probably be many weeks before any scheme even approaching the voluntary allocations program of 1948 will be in operation.

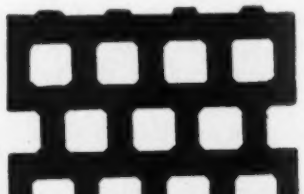
Military requirements in terms of so many tons of specific products are still lacking. For this reason, NPA has not called a meeting of its Steel Products Advisory Committee, and will not do so until definite information is at hand. At present, there is talk of formalizing the present industry allocations scheme as a starter. NPA is also discussing placing limitations on the use of scarce alloying materials such as nickel and columbium, before getting to the major industrial materials.

Condemns Strikes Against Pacts

Berkeley, Calif. — Strikes "popping like firecrackers" at the whim of workers violate precisely-drafted labor-company contracts, an integral part of which are procedures for arbitration of grievances, said John A. Stephens, vice-president of industrial relations, U. S. Steel Corp. of Delaware. He spoke last week at the University of California's Industrial Relations Institute.

"Mature collective bargaining will be enhanced when union members learn that having selected a union and conveyed to it the right under the law to speak and contract for them, they are bound by the agreement made.

Perforated metal screens



for any requirement

WITH facilities for producing any shape and size of perforations in any commercially rolled metal, of whatever gauge desired, Hendrick can furnish the most suitable form for a specific screening application.

To best meet certain requirements, Hendrick developed the "squaround" perforation illustrated. Other standard forms include round, square, hexagonal, diamond and slot perforations in hundreds of sizes of openings. Write for full information.

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Perforated Metals
Perforated Metal Screens
Architectural Grilles
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"Shur-Site" Treads and
Armorgrids

Stop-Gap Revenue Measure Seen as Tax Break for Industry

Washington — Business and industry are due for a few more tax "breaks" in the new November stop-gap revenue measure.

Faster write-offs on new plant and equipment are authorized for the first time since World War II. The new law permits 5-year amortization—at the election of the taxpayer — on defense facilities started after Dec. 31, 1949. Certificates of necessity are required.

Funds for War

The new stop-gap law is designed primarily to help raise funds for the Korean War and to drain off excess purchasing power. As it stands now, the Treasury expects to reap about $4.6 billion annually in new revenue. As far as corporations are concerned, they will pay a total of about $1.5 billion annually, starting next July 1. But individuals will start on Oct. 1 to contribute to an extra $2.7 billion annually.

There are no excise reductions in the new law. On the other hand, Federal excises of 10 pct are applied to retail sales of television sets and home freezers.

Coal Operators Name Directors

New York—Following election of Harry M. Moses as president and Joseph G. Chromis as secretary-treasurer of the Bituminous Coal Operators Assn. (The Iron Age, Sept. 21, p. 107) appointment of a board of directors was announced.

New directors are: Charles B. Baton, L. C. Campbell, E. L. Clair, W. H. Colvin, Jr., Charles Dorrance, Charles E. Dunlap, Benjamin F. Fairless, William W. Holloway, Arthur B. Homer, R. L. Ireland, Thomas S. Jamison, Jr., R. H. Knode, E. B. Leisenring, George H. Love, A. R. Matthews, J. L. Mauthe, Admiral Ben Moreell, C. J. Potter, Clarence B. Randall, J. P. Routh, H. G. Schmidt, W. P. Tams, Jr., J. William Wetter and Charles M. White.

Emlon is STABLE in water alkali acid

Have you tried Wyandotte Emlon? It has been used successfully for cold cleaning in spray washers. It can eliminate hazardous solvents in the pre-soak tank when a pre-clean is necessary to remove heavy soil and buffing compounds. It can be added to acid and alkali cleaners to increase cleaning efficiency. It can be added to finishing and removing compounds to facilitate their removal in later operations.

Emlon is a liquid that combines organic solvents and several emulsifiers. The solvents contribute high boiling characteristics . . . assure long-lasting solutions. The emulsifiers, because they are soluble in oil and water, remove inorganic as well as organic soil. Because these emulsifiers produce unusually stable emulsions instantaneously, you get better and faster cleaning action, longer solution life and lower cleaning costs.

Why not write for a sample?

WYANDOTTE CHEMICALS CORPORATION
Wyandotte, Michigan
Service Representatives in 88 Cities

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RUST-PROOFING PROCESS

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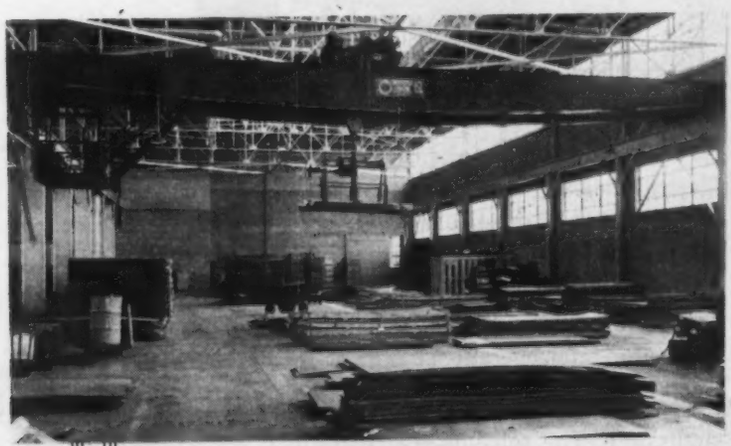


5 to 150 tons!

That's a quick example of the wide range of cranes we can build for you. Any lift, any span, any special design you need for your particular business. That's what we've been doing for 47 years, pleasing a lot of hard-to-please people. Count on us, too, as a top source for structural steel, steel buildings and gray iron castings. *Write for new catalog.*

BEDFORD FOUNDRY & MACHINE CO.
Bedford, Indiana

BEDFORD CRANES

New York Office—280 Madison Avenue—Murray Hill 5-0233

STEEL CONSTRUCTION NEWS

Fabricated steel awards this week included the following:

2600 Tons, Terre Haute, Ind., Power Plant Public Service Co. of Indiana units 1 and 2, to American Bridge Co.

2500 Tons, Kinston, N. C., Nylon plant for E. I. duPont de Nemours Co., to Ingalls Iron Works, Birmingham, Ala.

1500 Tons, Hutsonville, Ill., Central Illinois Public Service Co., power house unit No. 3, to American Bridge Co.

360 Tons, Building addition for Edward K. Tryon Co., Philadelphia, to Bethlehem Steel Corp., Bethlehem, Pa.

320 Tons, Providence, R. I., new men's dormitory through Gilbane Building Co., Providence to A. O. Wilson Structural Steel Co., Cambridge, Mass.

300 Tons, Wisconsin, Bridge Wisconsin State Highway Dept., to American Bridge Co.

250 Tons, Nurses' Home, Norristown State Hospital, Norristown, Pa., to Easton Steel Structural Co., Easton, Pa.

200 Tons, Chicago, Standard Stamping Co., to American Bridge Co.

175 Tons, Addition to the openhearth building of the Alan Wood Steel Co., Conshohocken, Pa., to Bethlehem Steel Corp., Bethlehem, Pa.

170 Tons, Long Beach, Calif., construction Del Amo Blvd. underpass and drainage culvert, through Bent Construction Co., Los Angeles, to Consolidated Western Steel Corp., Los Angeles.

170 Tons, Addition to the Piasecki Helicopter Corp., Morton, Pa., to Robinson Steel Co., Philadelphia.

150 Tons, Fairfield, Ala., Amsler-Morton Company, warehouse, to Virginia Bridge Company.

128 Tons, Denver, Colo., by State Highway Dept., for Fremont Co., 2.913 mi grade, surfacing, etc., through Brown Construction Co., Pueblo, Colo., to Midwest Steel & Iron.

115 Tons, Empire Brush Works, Port Chester, New York to Grand Iron Works.

100 Tons, St. Landry Parish, Louisiana bridge, Louisiana Highway Department, to Virginia Bridge Company.

Fabricated steel inquiries this week included the following:

2624 Tons, Beaver Co., Pa. Construction of divided highway, three (3) arches, and two (2) I-beam bridges. Secretary of Highways, Harrisburg, Pa. Bids due Sept. 29.

1600 Tons, Building for Lankenau Hospital, Lower Merion Township, Pa., bids due Sept. 28.

800 Tons, Chicago, residence halls for Medical Center, Chicago, bids due Oct. 10.

600 Tons, Disturbed Patients' Building, Holidaysburg Hospital, Holidaysburg, Pa., bids due Oct. 4.

400 Tons, Bethlehem Junior High School, Bethlehem, Pa., bids due Oct. 16.

350 Tons, Upper Darby High School, Upper Darby, Pa., bids due Sept. 28.

180 Tons, Addition to Princeton Hospital, Princeton, N. J., bids in.

153 Tons, Tioga County, Pa. Construction of base including extension of structure and pavement, and construction of three (3) I-beam

bridges. Secretary of Highways, Harrisburg, Pa. Bids due Oct. 13.

150 **Tons,** Nurses' Home, Bryn Mawr Hospital, Bryn Mawr, Pa., bids due Oct. 10.

Reinforcing bar awards this week included the following:

2385 **Tons,** Los Angeles, Calif., by Board of Public Works, for construction subway and appurt. work in Sepulveda Blvd., between Century Blvd. and Imperial Highway, through Oberg Bros. Construction Co., Inglewood, Calif., to Bethlehem Pacific Coast Steel Co., South San Francisco.

800 **Tons,** East Providence, R. I., sewerage project at Buckland Point through F. H. McGraw Co. to Joseph T. Ryerson and Co., Inc., Cambridge, Mass.

228 **Tons,** Glastonbury, Conn., three rolled beam bridges and approaches. Brunalli Construction Co., Southington, Conn., low bidder.

150 **Tons,** New Jersey Turnpike Contract 51, Route 6 overpass, Bergen County, N. J., Union Building & Construction Co., Passaic, N. J., low bidder.

150 **Tons,** Building M-12, State Hospital, Philadelphia, to Bethlehem Steel Corp., Bethlehem, Pa., from Wark & Co., Philadelphia, general contractor.

135 **Tons,** Glastonbury, Conn., three rolled beam bridges and approaches. Brunalli Construction Co., Southington, Conn., low bidder.

130 **Tons,** Allentown State Hospital, Allentown, Pa., to Bethlehem Steel Corp., Bethlehem, Pa., from H. E. Stoudt & Co., Bethlehem, general contractor.

100 **Tons,** Storm relief sewer, Wingohocking Street, Philadelphia, Joseph Lombardi & Son, Philadelphia, low bidder.

Reinforcing bar inquiries this week included the following:

899 **Tons,** Beaver Co., Pa. Construction of divided highway, three (3) arches, and two (2) I-beam bridges. Secretary of Highways, Harrisburg, Pa. Bids due Sept. 29.

Housing Sets New Record

Washington — Although legislative restrictions on credit for new housing will be heightened even more to put residential starts on the decline in 1951, final figures may show that a million new home units were started in the first 8 months of 1950. Preliminary estimates by the Bureau of Labor Statistics placed 1950 starts at 988,400 or 54 pct over the same period last year.

It virtually assures 1.3 million minimum starts this year to make residential building an influential factor in establishing a record year for building.

Cummins Starts New Construction

Columbus, Ind.—Construction of a new building containing 92,000 sq ft of floor space has been started by Cummins Engine Co., Inc. The new unit will house all materials and supplies, and inspection and shipping departments.

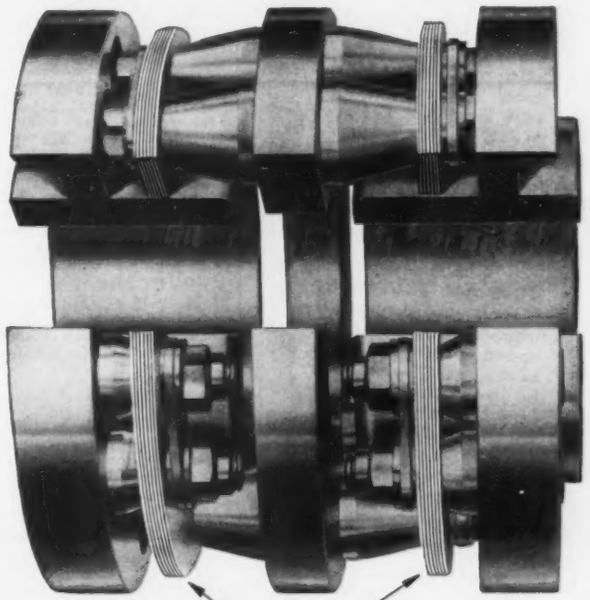
THOMAS *Flexible* ALL METAL COUPLINGS

FOR POWER TRANSMISSION • REQUIRE NO MAINTENANCE

Patented Flexible Disc Rings of special steel transmit the power and provide for parallel and angular misalignment as well as free end float.

Thomas Couplings have a wide range of speeds, horsepower and shaft sizes: ½ to 40,000 HP — 1 to 30,000 RPM.

Specialists on Couplings for more than 30 years



PATENTED FLEXIBLE DISC RINGS

BACKLASH FRICTION WEAR and CROSS-PULL are eliminated LUBRICATION IS NOT REQUIRED!

THE THOMAS PRINCIPLE GUARANTEES PERFECT BALANCE UNDER ALL CONDITIONS OF MISALIGNMENT.

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NO MAINTENANCE PROBLEMS.

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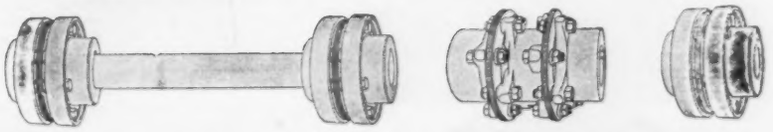
ALL PARTS ARE SOLIDLY BOLTED TOGETHER.



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WARREN, PENNSYLVANIA

PRECISION STAMPINGS
quickly... economically
DIAMOND G STAMPINGS
CUT COSTS... TIME
SAVE EQUIPMENT
Let our "know-how" and modern equipment save you dollars and time in getting metal stampings. We specialize in small and medium size stampings and produce them to precise specifications at minimum cost.
COMPLETE EQUIPMENT
Garrett equipment includes not only high speed presses of all sizes, but complete equipment for finishing, heat treating, tapping, welding and plating to assure you of high quality, inexpensive precision stampings.
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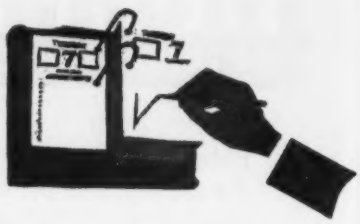
Dates to Remember



Oct. 2-6—Gas Appliance Manufacturers' Assn., exposition, and **American Gas Assn.**, annual convention, Atlantic City Auditorium, Atlantic City, N. J. Association headquarters are at 420 Lexington Ave., New York.

Oct. 4-6—American Hot Dip Galvanizers Assn., semiannual meeting, Greenbrier Hotel, White Sulphur Springs, W. Va. Association headquarters are at 2311 First National Bank Bldg., Pittsburgh.

Oct. 6-8—National Assn. of Waste Material Dealers, fall meeting, Hotel Traymore, Atlantic City, N. J. Association headquarters are in the Times Bldg., New York.

Oct. 10-12—Society of Industrial Packaging & Materials Handling Engineers, exposition, Convention Hall, Philadelphia. Society headquarters are at 20 W. Jackson Blvd., Chicago.

Oct. 12-13—Gray Iron Founders' Society, annual meeting, Netherlands Plaza Hotel, Cincinnati. Society headquarters are at 210 National City-E. 6th Bldg., Cleveland.

Oct. 15-17—Conveyor Equipment Manufacturers Assn., convention, Greenbrier Hotel, White Sulphur Springs, W. Va., Association headquarters are at 1129 Vermont Ave., N.W., Washington.

Oct. 16-18—Society of Automotive Engineers, transportation meeting, Hotel Statler, New York. Society headquarters are at 29 W. 39th St., New York.

Oct. 16-20—National Safety Congress & Exposition, Congress Hotel, Chicago. Council headquarters are at 425 N. Michigan Ave., Chicago.

Oct. 18-20—Society of the Plastics Industry, annual conference, New Ocean House, Swampscott, Mass. Society headquarters are 295 Madison Ave., New York.

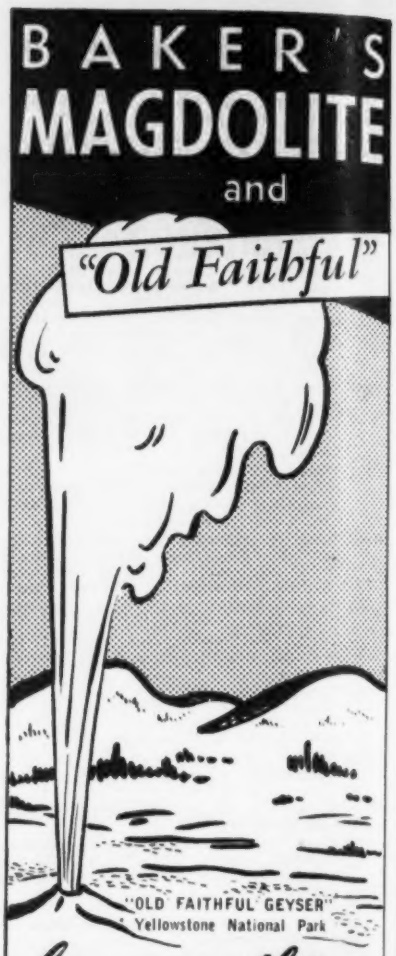
Oct. 23-25—American Gear Manufacturers Assn., semiannual meeting, Edgewater Beach Hotel, Chicago. Association headquarters are in the Empire Bldg., Pittsburgh.

Oct. 23-26—American Institute of Steel Construction, annual meeting, Shamrock Hotel, Houston. Institute headquarters are at 101 Park Ave., New York.

Oct. 23-27—National Metal Congress & Exposition, International Amphitheater, Chicago. American Society for Metals headquarters are at 7301 Euclid Ave., Cleveland.

Oct. 24-25—American Society of Mechanical Engineers, Fuels Div. and American Institute of Mining & Metallurgical Engineers, Coal Div., joint fuels conference, Hotel Statler, Cleveland. ASME headquarters are at 29 W. 39th St., New York.

Oct. 26-28—Audio Engineering Society, audio fair, Hotel New Yorker, New York. Society's address is P. O. Box F, Oceanside, N. Y.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MAGDOLITE
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"OLD FAITHFUL GEYSER"
Yellowstone National Park
have one thing in common...
Both are absolutely dependable, day and night. You can trust both of them to perform, year in and year out.
Baker's Magdolite stands alone as the original dead-burned dolomite refractory... used and trusted for many years by discriminating open hearth and electric furnace superintendents.
Uniform ingots... in greater numbers... at lower fuel costs ...with less defective material ...at distinct savings to you. That's the unchanging five-point Baker's Magdolite story. The J. E. Baker Company, York, Pennsylvania. Plants at Billmeyer, Pennsylvania and Millersville, Ohio.
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SINCE 1889
61 YEARS OF SERVICE

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PUBLICATIONS

Continued from Page 36

straw-colored aqueous solutions. Their interesting thickening, suspending, stabilizing and film-forming characteristics are covered in the bulletin. *Industrial Chemicals Div., American Cyanamid Co.*

For free copy insert No. 8 on postcard, p. 37.

Fluid Facts

Prepared to serve primarily as a reliable guide to better machining, a new 66-p. booklet entitled "Cutting Fluid Facts" has been written with the basic thought of assisting to make a fresh and studied approach to the selection and application of cutting fluids. Although their application is still an art rather than a science, as pointed out in the booklet, there is much scientific information on the subject which, when related to experience by careful observation, will form a solid basis for a productive and cost-cutting program. *D. A. Stuart Oil Co., Ltd.*

For free copy insert No. 9 on postcard, p. 37.

Speed Reducers

Cleveland type AT and RT worm gear speed reducers are described in a new 36-p. bulletin. Several new engineering features of these units are presented in the bulletin. The new horsepower rating tables are easier to work with for they show output speeds and the more frequently used 1750 rpm ratings on the left of the page. The booklet is designed to supplement this company's catalog No. 200, until the catalog can be revised and reprinted. *Cleveland Worm & Gear Co.*

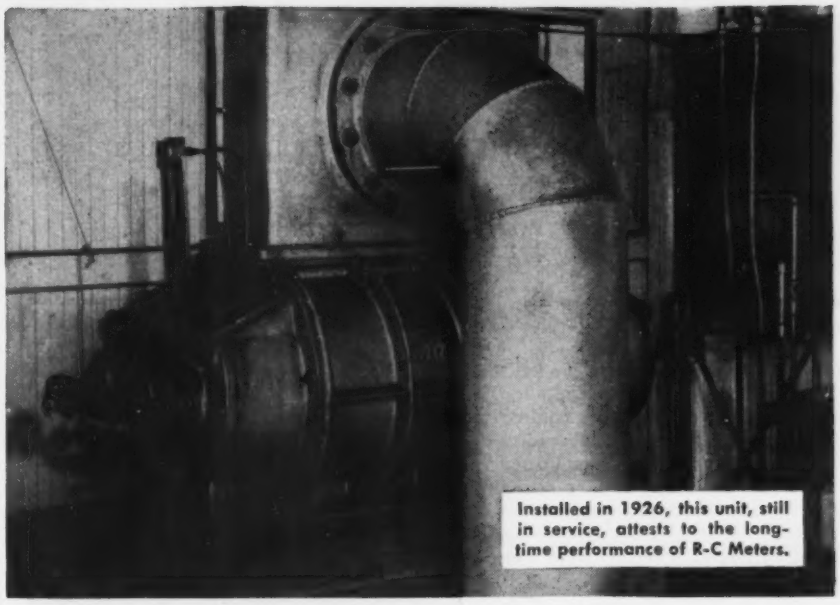
For free copy insert No. 10 on postcard, p. 37.

Lighting Units

The new series 4000 Sportsliters, for modern, efficient, protective lighting of railroad yards and industrial plants, are described and illustrated in a new 4-p. folder. A series of layouts with bill of material for each is included in the bulletin. *Steber Mfg. Co.*

For free copy insert No. 11 on postcard, p. 37.

Resume Your Reading on Page 37



Installed in 1926, this unit, still in service, attests to the long-time performance of R-C Meters.

NO PENSION FOR THIS OLD-TIMER even after *23* years of service

Accurate and dependable as always, this 23-year-old Roots-Connersville Meter still performs faithfully. No retirement for this veteran! Because new demands called for higher capacity, it has been transferred to another job in the same plant. Its old duties have been taken on by a new R-C unit, purchased because of fine performance of this old-timer.

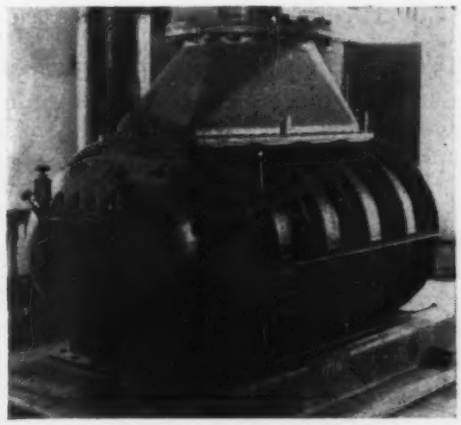
That's a common history of R-C Meters. They're built to measure accurately, and keep on doing it, year after year. Simple design, finely machined measuring surfaces and other important refinements account for their ability to measure gas accurately and unfailingly, almost indefinitely.

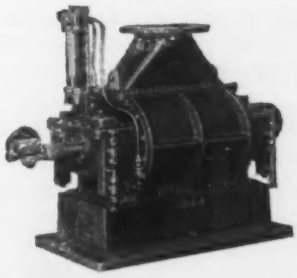
With 31 standard sizes and capacities from 4,000 to 1,000,000 cfh, R-C Meters meet the needs of most applications. Write for Bulletin 40-B-14 or tell us your specific requirements.

ROOTS-CONNERSVILLE BLOWER CORPORATION
509 Ohio Avenue, Connersville, Indiana

(Right) This R-C Meter, with capacity of 317,000 cfh, replaced the "old-timer" above, now transferred to other duties.

(Below) Typical small capacity R-C Meter for low and medium pressures.





ROOTS-CONNERSVILLE

BLOWER BUILDERS R-C SINCE 1854

ONE OF THE DRESSER INDUSTRIES

Simultaneous Flame Cutting— Softening eliminates cracks on certain steels

A STEEL COMPANY faced the well-known problem that silicon and alloy steels, when heated to the point required by oxyacetylene cutting, and allowed to cool by air, will develop a high degree of hardness. Also, they develop cracks along the cut edge. The company wanted to retard the cooling rate with an annealing flame, and eliminate this hardness and attendant cracking.

A. H. Yoch, Airco Technical Sales Service Specialist, suggested and assisted in developing equipment and technique for flame softening the steel simultaneously with the machine gas cutting operation.

He devised a special torch set-up (as illustrated) with the annealing flame following closely, in a fixed position, behind the cutting flame. This retarded the cooling, eliminated the need for manual softening, and resulted in a faster, superior annealing job. By retarding the cooling rate with an annealing flame, the hardness and attendant cracking were dispelled.

Further, the speed with which the Airco No. 4 Radiagraph operates saved many production hours—a money-saving performance fact that is constantly winning new friends for this unique gas cutting machine.

For more information about flame cutting and softening, or for Technical Sales Service on a problem involving the use of the oxyacetylene flame or electric arc, call your nearest Airco office.

AIRCO AIR REDUCTION

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NEW

PRODUCTION IDEAS

Continued from Page 40

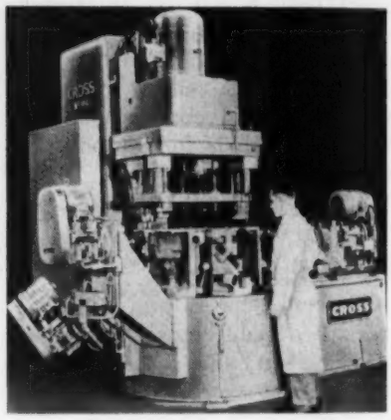
Sunnen honing machines. As the hole is honed larger the stone feeds up automatically. The gage shows how fast and how much the stone feeds up and tells when to gage the hole. *Sunnen Products Co.*

For more data insert No. 25 on postcard, p. 37.

Special Machine Tool

Drills, reams and spot faces automatic transmission housings.

The new machine is a five-station, dial type with power driven index table. One operator finishes 85 pieces per hr at 100 pct efficiency, performing 29 operations. One of the features of the machine is the use of the Cross Machine



Control Unit with Toolometer that stops the machine when any tool requires changing and groups the changes to reduce down time. Preset tools further reduce down time by eliminating adjustments for tool changes. Automatic lubrication, J.I.C. Standard hydraulic and electrical installations and the use of standard Cross sub-assemblies to facilitate maintenance are other features. *Cross Co.*

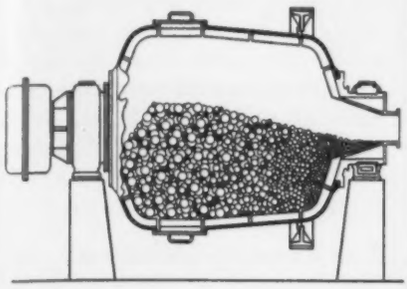
For more data insert No. 26 on postcard, p. 37.

Ball Mill

For wet and dry grinding and pulverizing applications.

An important feature of the Tricone ball mill is its slightly tapered shape which keeps the larger grinding balls at the feed end of the mill to crush the coarser incoming material. It embodies the good fea-

tures of the Hardinge Conical Mill, but provides additional room for smaller grinding media at the discharge end. Structurally it consists of a conical or convex feed head; a short cylindrical section; a long tapered conical section; and



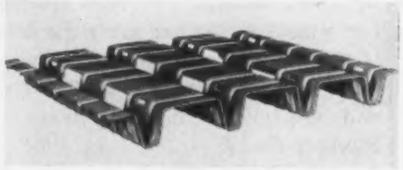
a wide-angle conical or convex discharge head. Operating advantages include proper ball segregation, maximum energy at the feed end where greatest crushing force is needed, convex heads that increase ball turbulence, and its spherical shape providing maximum working volume for minimum liner surface. *Hardinge Co., Inc.*

For more data insert No. 27 on postcard, p. 37.

All-Steel Pallet

Lightweight, carries 10 tons; good for ship-and-return work.

New Nesteel all-steel pallets allow four-way fork lift entry, and have adequate perforations for banding and tieing loads to the pallets. They will nest one into an-



other, conserving warehouse space and preventing slipping when crane handled. The pallet is manufactured in a wide variety of gages and sizes and because it is light weight, can be handled by one man. *Powell Pressed Steel Co.*

For more data insert No. 28 on postcard, p. 37.

Improved Lifting Magnet

For use on cranes to hoist, load or transport magnetic materials.

An improved lifting magnet can be used on overhead or crawler cranes to handle various types of magnetic materials. Improvements over earlier models include lighter

steel strip from continuous coils . . .

FOLLANSBEE COLD ROLLED STRIP feeds right from the coil into your automatics—a continuous supply of uniform strip steel for any kind of forming operation. Manufactured to your specifications Follansbee Cold Rolled Strip is available in tempers and finishes for most industrial applications.

time-saving supply system

FOLLANSBEE COLD ROLLED STRIP is production-line steel strip with machining characteristics suitable for freezers or furniture or fixtures. Regardless of the forming operation involved, the continuous feeding of Follansbee Cold Rolled Strip from coils saves time and labor and material.

that keeps automatics in action

FOLLANSBEE COLD ROLLED STRIP and Follansbee Polished Blue Strip are both furnished in continuous coils that keep automatics in action for real productioneering teamwork. To help you select coil diameters and weights, we'll send you without charge a Follansbee Coil Weight Calculator. Just write us on your business letterhead.

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"More COLOR, Plunkett..COLOR Sells!"

Yes, COLOR! In your product, it's great medicine for anemic sales. It's an easy prescription to fill, too. Pre-coated THOMAS STRIP adds it, without costing you one red cent for new equipment . . . saves plenty, in fact, by eliminating several processing steps. And, the snap and sparkle of gleaming Thomas coatings quickly change lack-lustre products into brisk best-sellers.

★ ★ ★

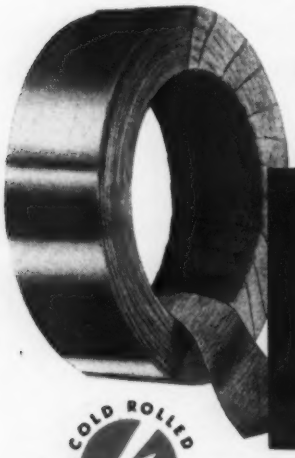
For example, why not test the color possibilities of LACQUER COATED THOMAS STRIP? In bright red, green or yellow, it's widely used for decorative purposes. And, it saves you the costs of final finishing of fabricated parts.

Or, choose gleaming THOMAS Coatings in golden sheens of BRASS, the rich glow of COPPER, the brilliance of NICKEL and of CHROMIUM, the soft, silvery lustre of ZINC, TIN and LEAD ALLOY.

Prefer to paint your products? Then you'll find ZINC-COATED BONDERIZED THOMAS STRIP an economical base for paint, lacquer and enamel.

In any case, ready-to-use *pre-coated* THOMAS STRIP will help streamline your manufacturing process to two essentials—fast fabrication and assembly. What's more, it extends the material and fabricating economies of steel to parts once made of more costly metals. We'll be happy to send you more details, and to arrange a test run in your plant. Just write:

THE THOMAS STEEL COMPANY
WARREN, OHIO
Specialists in Cold Rolled Strip Steel



COLD ROLLED STRIP STEEL

Electrocoated with Zinc, Copper, Nickel, Brass and Chromium • Hot Dipped Tin and Lead Alloy • Lacquer Coated in Colors • Annealed Spring Steel • Alloy Strip Steel • Uncoated Strip Steel • Produced to Your Specifications.

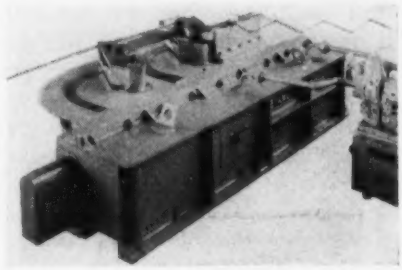
weight, welded construction, an insulating compound that dissipates heat more rapidly and provides more protection against short circuits between individual coil wires, four-point chain suspension, a balanced magnetic circuit that eliminates flux bottle-necks giving the magnet greater lifting ability. Five sizes are available: 29, 39, 45, 55, and 65 in. diam. *Dings Magnetic Separator Co.*

For more data insert No. 29 on postcard, p. 37.

Bar Bending Machine

Bends reinforcing bars singly or four at a time, at 6 strokes per min.

The No. 2 Webb bar mending machine bends bars up to ⅞ in. diam. The arms are adjustable and will make bends to a minimum



center distance of 7⅜ in. The bending arms have replaceable guides and bending steels. They are actuated hydraulically and are equipped with air-operated ejectors for removing the bar after the bend is made. The machine is complete with hydraulic pump unit, motor and electrical controls. *Wm. K. Stamets Co.*

For more data insert No. 30 on postcard, p. 37.

Welding Control Unit

For shielded (inert gas) stud welding of aluminum, stainless.

A new stud welding control unit provides electronic timing control for the weld period, and automatic (pneumatic) timing control of the inert gas prior to and after the weld. The control unit is portable and ruggedly built to withstand heavy industrial use. Calibrated adjustment dials are mounted on a dead front panel. Rigidly mounted fittings located on one side of the enclosure provide connections for arc welder and stud gun, inlet and

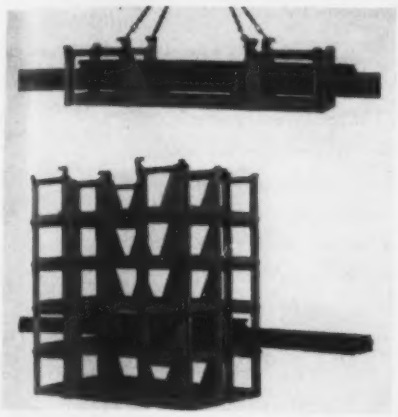
outlet gas hose, control cable, and 110 v power supply. *Shielded Stud Welding Co.*

For more data insert No. 31 on postcard, p. 37.

Portable Bar Racks

The units are of all-steel welded construction, built to any capacity.

New portable heavy duty bar racks are designed for more efficient handling and storage of steel



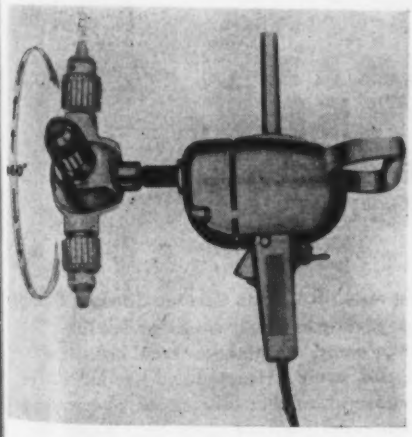
bundles by one-man operation. Use of this equipment enables the operator to place bundles in racks for storage in tiers, any rack being easily accessible for selection of material desired. *Palmer-Shile Co.*

For more data insert No. 32 on postcard, p. 37.

All-Angle Head Drill

Head rotates full 360°; capacities range from ½-in. steel to 4-in. wood

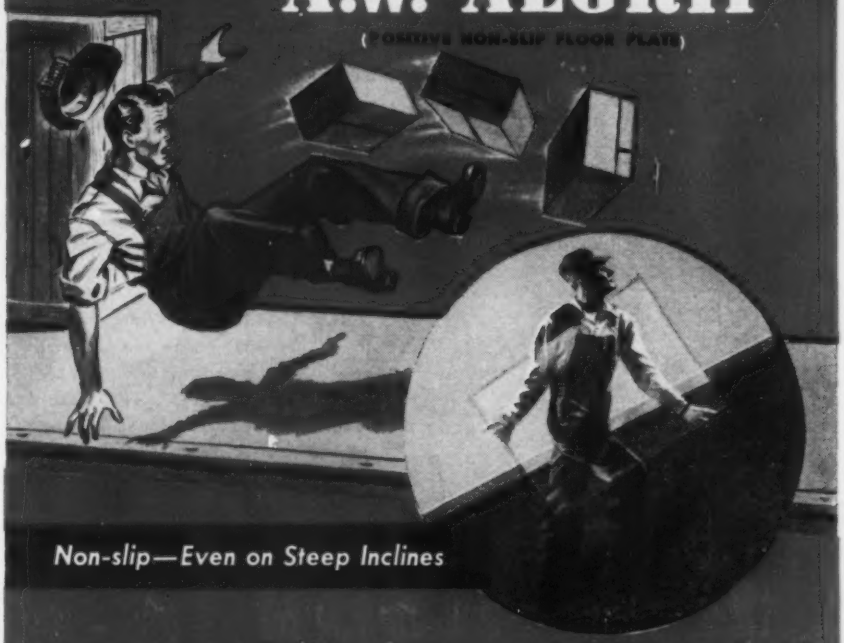
With a low speed of 275 rpm for deep boring, high speed of 1100 rpm for small holes and drilling lumber, the all-angle head drill has a wide range of usefulness and



speeds up work. The head rotates through the full 360°, and when it is set at a right angle, the tool measures only 7½ in. overall width. The angle head is removable from the spindle. It will fit any make

NOW! END SLIPPING ACCIDENTS WITH A.W. ALGRIP

(POSITIVE NON-SLIP FLOOR PLATE)



Non-slip—Even on Steep Inclines

Even distribution of abrasive particles shown by magnifying glass.

Prevents slipping on factory floors, walkways, etc.

Protects workmen and vehicles from slipping on ramps and loading platforms.

REVOLUTIONARY, NEW ABRASIVE ROLLED STEEL FLOOR PLATE

Now, for the first time you can prevent dangerous, expensive slipping accidents with A.W. ALGRIP ABRASIVE *Rolled Steel* Floor Plate. It's the non-slip floor plate that safety engineers, architects, purchasing agents and plant owners have always wanted.

A.W. ALGRIP is made by rolling abrasive grain as an integral part of the upper portion of steel plate. It retains its non-slip qualities for a lifetime, because as the surface wears new abrasive particles are constantly exposed.

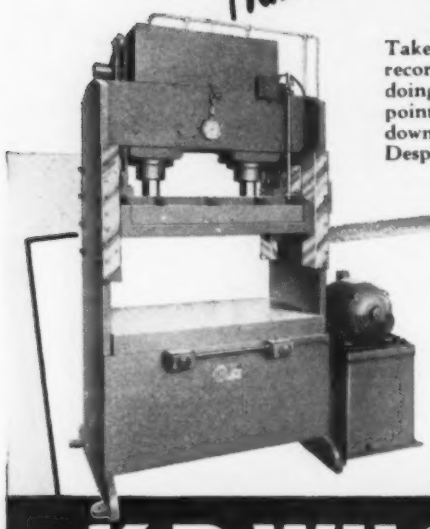
Install A.W. ALGRIP for positive non-slip protection in all areas subjected to oil, grease or water on which men walk or climb . . . loading platforms, ramps, washroom floors, fire escapes, running boards and similar surfaces. A.W. ALGRIP prevents slipping even on steep inclines. And remember it's low in cost, easy to install, requires no maintenance, and is resistant to heat, fire and heavy traffic.

Write or use coupon for complete information about this amazing, new, non-slip floor plate now.

NEW NEW NEW

KRW HYDRAULIC PRESSES

famous for PUSHING DOWN COSTS



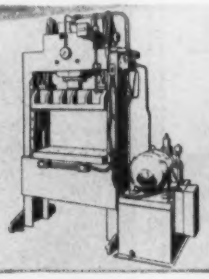
Take a look at the records — the records of KRW Presses that are doing your kind of work. They all point up a proven way to push down mounting production costs. Despite their low price tag they are built to unexcelled standards of quality and efficiency. That's why they are famous for multiplying profits long after the purchase price is forgotten. Write or wire for complete information.

TWO CYLINDER TYPE—Tons capacity: 60, 85, 100. Platen and bolster, maximum usable size: F to B, R to L, 36" x 60". Stroke: 6", 11". Bed: fixed. Controls: Manual, Semi-Automatic, Fully Automatic for cycled operation.

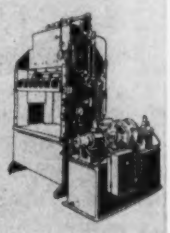
KRW PRESSES—are self-contained and fabricated of steel for maximum strength, minimum weight and space conservation. KRW hydraulic presses can be custom built to meet your manufacturing requirements.

K·R·WILSON

215 MAIN ST. BUFFALO 3, N. Y.



THREE CYLINDER TYPE — Tons capacity 75, 100, 125, 150. Platen and bolster, maximum usable size: F to B, R to L, 45" x 72". Stroke: 6", 11". Bed: fixed. Controls: Manual, Semi-Automatic, Fully Automatic for cycled operation.



ONE CYLINDER TYPE—Tons capacity: 25, 50, 75, 100, 125, 150. Platen and bolster, maximum usable size: 24" F to B, 36" R to L. Stroke: 6", 11", 18". Bed adjustment: increments of 6". Controls: Manual, Semi-Automatic, Fully Automatic for cycled operation.

Quantity PRODUCTION of GREY IRON CASTINGS

ONE OF THE NATION'S LARGEST AND MOST MODERN PRODUCTION FOUNDRIES

ESTABLISHED 1866

THE WHELAND COMPANY

FOUNDRY DIVISION

MAIN OFFICE AND MANUFACTURING PLANTS

CHATTANOOGA 2, TENNESSEE

Built to Last!

RUTHMAN GUSHER

MACHINE TOOL COOLANT PUMPS

Everything about Ruthman Gusher Coolant Pumps is designed to give you long trouble-free life. There are fewer parts to wear, no metal-to-metal contact within the pump. Heavy-duty, pre-lubricated ball-bearings require no further lubrication or attention. Dynamically balanced rotating parts cut vibration to an absolute minimum. Your coolant system will last longer, work better when you specify Ruthman Gusher Coolant Pumps. Write for Catalog today.

THE RUTHMAN MACHINERY CO.

1821 READING ROAD — CINCINNATI, OHIO

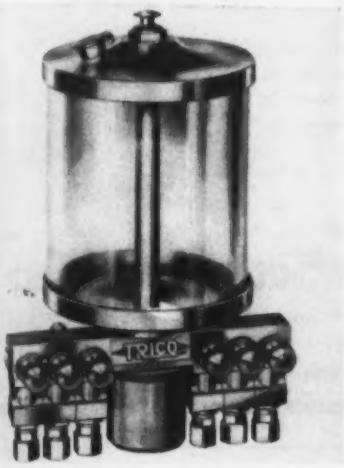
½-in. electric drill having ½-20 threaded spindle. *Cummins Portable Tools.*

For more data insert No. 33 on postcard, p. 37.

Multiple Feed Oilers

Deliver a measured quantity of oil to multiple bearing points.

New automatic solenoid or manual control multiple feed oilers provide a centralized system of lubricating 1 to 20 bearing points on machine tools, punch presses



and high speed production equipment. Oilers are mounted above the highest point to be lubricated and heavy or light oils are fed by gravity from a large reservoir through individually adjustable needle-valves and through copper or Neoprene tubing to the bearings. *Trico Fuse Mfg. Co.*

For more data insert No. 34 on postcard, p. 37.

Speed Control Valves

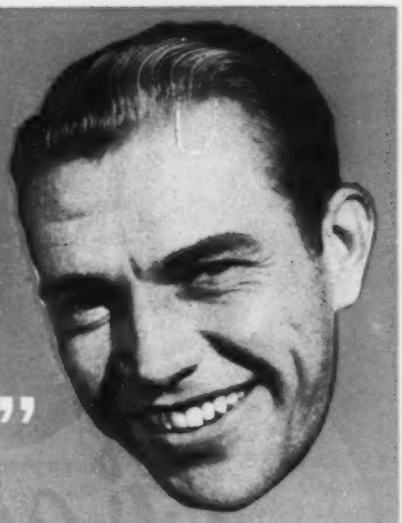
Feature micrometer graduations for precision control of air, water, oil.

A new line of Flo-Set speed control valves are suitable for air, water or oil control with maximum pressure to 250 psi and maximum temperature of 250°F. They may be mounted in any position. Controlled flow is provided by turning adjustment sleeves at either end of the valve. Valves are available in ¼, ⅜ and ½ in. sizes. All metal parts are aluminum except stainless steel springs. Seals and poppets are molded synthetic. *Hanna Engineering Works.*

For more data insert No. 35 on postcard, p. 37.

Resume Your Reading on Page 41

I know—
"CERTIFIED"
is the best abrasive



As Purchasing Agent I have to see that the abrasive we use is the most economical. This means a hard, slow wearing abrasive like "Certified" . . . one that can be used over and over. An abrasive that does a good job in the cleaning room . . . one that gets castings really clean in a hurry.

"CERTIFIED" IS TOPS! Each grain of Samson Shot and Angular Grit is a solid homogenous mass that wears slowly, lasts longer for top-efficiency blast cleaning at lowest cost. "Certified's" special automatically controlled hardening process gives 'em plenty of extra hardness for cleaner castings. Order "Certified" today for faster, better, cheaper blast cleaning.

Always specify "Certified"

PITTSBURGH CRUSHED STEEL CO.
PITTSBURGH, PENNA.

STEEL SHOT AND GRIT CO.
BOSTON, MASS.

In producing this pump flange, Powdermet production saved 400%!
Price
IS THE ONLY DIFFERENCE!
Powdermet makes this gov
weight cost only 1/10 a
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POWDERMET* PARTS
Cost Less!
"Matched pairs" like these... actual production parts, one produced by conventional methods and one Powdermet, identical in precision and performance... prove the amazing economies made possible through Powdermet fabrication. And when special properties like electrical permeability or controlled porosity are important, Powdermet parts offer functional advantages too! Exclusive Powdermet production techniques have extended the application of powder metallurgy to whole new production fields—helical gears, stress members, filters—write today for the free booklet shown here and see how you can save with Powdermet parts!
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POWDERED METAL PRODUCTS CORPORATION of America

Increase Your Production of Small, Hard-to-make Parts

Send for our new booklet "Modern Precision Investment Casting." It's free.

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New equipment and new materials make this process a dependable tool. Write us for equipment and supplies, process information, and casting sources.

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THE **WEBB** PLATE BENDING ROLL

Built in Two Types, Initial Pinch and Pyramid. Complete Range of Sizes and Models.

Prompt Delivery on Standard Sizes

Webb Plate Bending Rolls are designed and built for the forming of cylindrical shapes from rolled steel plate with greater speed and accuracy for high quality production.

All Webb Rolls are backed by continuous progress in the development of industrial machinery since 1881.

WRITE FOR CATALOG

MANUFACTURERS OF PLATE ROLLS, COMBINATION PUNCH & SHEARS

Industrial Weighing Equipment

Since 1881

THE **WEBB** CORP.

WEBB CITY, MO.

Briefs and Bulletins

pig iron up—By Monday of this week several pig iron producers advanced all their grades by $3.00 a ton. They include Hanna Furnace Corp. at Buffalo, which also advanced silvery iron extras by 50c a ton; Interlake Iron Corp. at Chicago, Duluth, Erie and Toledo; Republic Steel Corp. at Cleveland and Buffalo; Shenango Furnace Co. at Sharpsville; and Youngstown Sheet & Tube Co., Youngstown. Mystic Iron Works, Everett, Mass., advanced $1.75 per ton for fourth quarter delivery. Lone Star Steel Co., Daingerfield, Tex., prices on its three grades went up $3.50 a ton, and Sloss-Sheffield pushed up its pig iron by the same amount.

parts orders—Parts manufacturers are being deluged with orders. In an attempt to discourage one time buyers and serve their regular accounts one company has hit on a plan to distinguish between those who will continue to do business with them for certain parts. When they are asked to make a certain part they look at the date of the blueprint submitted. If they see a 1947 or 1948 dateline on the blueprint they refuse to take the order. They feel the customer has had the parts made some place else formerly and is unable to place orders there now, so they are coming to them.

paper shortage—Steel mills are suffering in the paper shortage. They use tons of paper for interleaving in coils to protect the surface of steel. With paper in strong demand, paper mills are finding it more lucrative to produce paper bags and cardboard, slighting the product for steel mills. Paper buyers for steel mills are caught in a fast race for supplies.

sheets—Consumers report cold-rolled sheet deliveries falling farther and farther behind. Some now believe that the mills will drop at least 6 weeks, and maybe 8, in order to catch up. Conversion deliveries are also dragging.

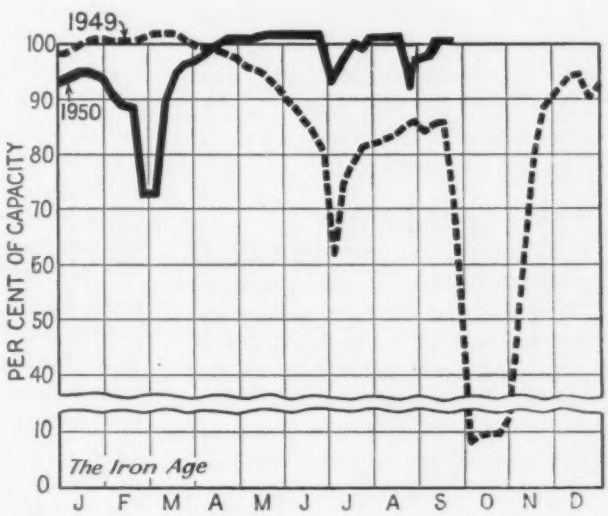
alloy—Forging bars and alloy steel are now nearly as scarce as flat-rolled. Everybody is behind on alloy, and the growing production of tanks and aircraft promises no improvement.

expect big carryover—Almost all companies expect to have a big carryover into the first quarter. One reports that it is going to drop out January deliveries of pipe in an attempt to clean up old orders. Many will not open books for the first quarter until Nov. 1, so they can get a better idea of what they can deliver.

austerity cars—Some in Detroit think that the Austerity Car is in the offing for 1952. Bumper manufacturers are reportedly cutting back nickel plating from .0015 to .0010 and some pessimists see the end of a lot of chromium plating on cars in 1950. Observers feel that the situation hinges on the development of the war situation and its needs.

holding back changes—Only those with the rosiest of rose-colored glasses can see completion of the 1952 model cars that are now well along into the tooling stage. One carmaker has shelved plans for a new motor, it is reported, and the trend might spread to other producers.

Steel Operations**



District Operating Rates—Per Cent of Capacity**

Week of	Pittsburgh	Chicago	Youngstown	Philadelphia	Cleveland	Buffalo	Wheeling	South	Detroit	West	Ohio River	St. Louis	East	Aggregate
Sept. 17	98.0*	102.5	92.0*	92.0	97.5*	104.0	102.0	108.0	101.0	105.0	89.0	91.0	102.0	100.5
Sept. 24	93.0	109.5	93.0	92.0	97.0	104.0	102.0	104.0	101.0	106.0	89.0	91.5	102.0	100.5

* Revised.

** Steel operations for the first half of 1950 are based on annual capacity of 99,392,600 net tons. Beginning July 1, 1950, operations are based on new annual capacity of 100,563,500 net tons.

Nonferrous Metals OUTLOOK

Market Activities

Alcoa increases aluminum pig and ingot ½¢ per lb . . . Copper scrap rises ½¢ per lb on conversion demand . . . Good news from Korea stabilizing market . . . July tin imports hit peak.

New York—Following the Aluminum Co. of America's announcement of a wage increase last week was the announcement of a 1½¢ increase in the price of aluminum ingots and pig aluminum. This brings ingots to 19¢ per lb and pigs to 18¢ per lb. Alcoa's fabricated aluminum prices have not yet been revised. The new prices went into effect on Monday, Sept. 25. Other producers have not yet followed the move.

The split-price copper market continues in effect with heavier sales being made at the 22.50¢ level than at the 24.50¢ price. Meanwhile, in Washington, Senator McMahon has withdrawn his proposal for the suspension of the copper import duty. This eliminates any possibility that the suspension bill will be passed during this session but there is some feeling in congressional circles that opposition of the mining state Senators might decrease after the coming elections.

Copper Scrap Rises

Following Senator McMahon's action, the Senate passed without objection the bill for suspension of the import duty on metal scrap. This had been held back by the Senate for a year and will now have to go back to the House of Representatives for approval of the new suspension period.

Dealers' prices for scrap copper have been sent upwards again by continuing conversion deals. The new price for No. 1 heavy copper and wire is 20½¢ to 21¢ per lb, for No. 2 heavy copper and wire it is 19½¢ to 20¢, and for light copper it is 18½¢ to 19¢.

Isolated sales have been reported where No. 2 copper was sold for as high as 23¢ per lb but the dealers are trying to hold down the prices so that they will not be caught with high priced material when the conversion demand falls off. The good news from Korea has had the effect of easing the market slightly and there is now much less chance of a runaway market.

Consumers of lead are still buying as much as they can lay their hands on, but there is a tendency away from buying in the open market at premium prices. Meanwhile, fairly heavy imports continue and there is a possibility of a price dip fairly soon.

In view of revised smelting prices, the price of dry battery plates has declined ¾¢ to a range of 8¢ to 8¾¢ per lb. The smelting charge has risen from $25 to $35 per ton with as high as $40 and even $45 a ton being reported.

Bureau of Mines statistics show that the lead output of domestic mines dropped 15 pct in July to the lowest point since October 1949. July production totaled only 31,138 net tons compared with 36,713 net tons in June.

At the same time, July zinc production also fell off by 6 pct from the preceding month. Production in July was 48,898 tons compared with June production of 50,184 tons.

Tin Imports Hit Post-War High

World production of tin also showed a decline (10.5 pct) from June. Total production for the month is estimated by the International Tin Study Group to have been 13,500 tons. Production of the countries for which figures are available was as follows: Malaya, 5071 gross tons; Indonesia, 2792 gross tons; Belgian Congo, 1236 gross tons; and Nigeria, 595 gross tons. Figures so far available for the month of August are 752 tons, 2829 tons, and 1509 tons for Malaya, Indonesia, and the Belgian Congo respectively.

During the same month U. S. imports of tin hit a new post-war peak of 11,621 tons. Of this total 6448 tons came from Malaya, 2234 came from the Netherlands, 1704 came from the United Kingdom, and 715 tons came from Belgium.

NONFERROUS METALS PRICES

	Sept. 20	Sept. 21	Sept. 22	Sept. 23	Sept. 25	Sept. 26
Copper, electro, Conn.	22.50–24.50	22.50–24.50	22.50–24.50	22.50–24.50	22.50–24.50	22.50–24.50
Copper, Lake, delivered ..	24.025	24.025	24.025	24.025	24.025	24.025
Tin, Straits, New York ...	$1.025	$1.03	$1.035	....	$1.04	$1.04*
Zinc, East St. Louis	17.50	17.50	17.50	17.50	17.50	17.50
Lead, St. Louis	15.80	15.80	15.80	15.80	15.80	15.80

Note: Quotations are going prices.
*Tentative.

MILL PRODUCTS

Aluminum

(Base prices, cents per pound, base 30,000 lb, f.o.b. shipping point, freight allowed)

Flat Sheet: 0.188 in., 2S, 3S, 27.4¢; 4S, 61S-O, 29.3¢; 52S, 31.4¢; 24S-O, 24S-OAL, 30.3¢; 75S-O, 75S-OAL, 36.8¢; 0.081 in., 2S, 3S, 28.4¢; 4S, 61S-O, 30.7¢; 52S, 32.8¢; 24S-O, 24S-OAL, 31.4¢; 75S-O, 75S-OAL, 38.5¢; 0.032 in., 2S, 3S, 30.0¢ 4S, 61S-O, 34.0¢; 52S 36.7¢ 24S-O, 24S-OAL, 38.4¢; 75S-O, 75S-OAL, 48-1¢.

Plate: ¼ in., and heavier: 2S, 3S, F, 24.8¢ 4S-F, 27¢; 52S-F, 28.1¢; 61S-O, 27.6¢; 24S-F, 24S-FAL, 28.1¢; 75S-F, 75S-FAL, 34.9¢.

Extruded Solid Shapes: Shape factors 1 to 4, 33.6¢ to 67¢; 11 to 13, 34.3¢ to 79¢; 23 to 25, 36.3¢ to $1.08; 35 to 37, 43.3¢ to $1.66.

Rod Rolled: 1.5 to 4.5 in., 2S-F, 3S-F, 34.5¢ to 31¢; Cold-finished, 0.375 to 3 in., 2S, 3S, 37¢ to 32.5¢.

Screw Machine Stock: Rounds, 11S-T3, R317-T4, ⅛ to 11/32 in., 49.5¢ to 38.5¢; ⅜ to 1½ in., 38¢ to 36¢; 1 9/16 to 3 in., 36¢ to 33¢; 17S-T4 lower by 1¢ per lb. Base 5000 lb.

Drawn Wire: Coiled, 0.051 to 0.374 in.; 2S, 36.5¢ to 27¢; 52S, 44.5¢ to 32.5¢; 56S, 47.5¢ to 39¢; 17S-T4, 50.5¢ to 35¢; 61S-T4, 45¢ to 34.5¢; 75S-T-6, 76.5¢ to 55.5¢.

Extruded Tubing, Rounds: 63S-T5; OD in in.: 1¼ to 2, 33.5¢ to 49¢; 2 to 4, 30.5¢ to 41.3¢; 4 to 6, 31¢ to 37.8¢; 6 to 9, 31.5¢ to 39.3¢.

Roofing Sheet, Flat: 0.019 in. x 28 in. per sheet, 72 in., $1.085; 96 in., $1.446; 120 in., $1.806; 144 in., $2.170. Gage 0.024 in. x 28 in., 72 in., $1.306; 96 in., $1.743; 120 in., $2.179; 144 in., $2.615. **Coiled Sheet:** 0.019 in. x 28 in., 26.7¢ per lb; 0.024 in. x 28 in., 25.4¢ per lb.

Magnesium

(Cents per lb, f.o.b. mill, freight allowed)

Sheet and Plate: M-O, FS-O. ¼ in. 58¢ to 60¢; 3/16 in. 60¢ to 62¢; ⅛ in. 62¢ to 64¢; B & S gage 10, 63¢ to 65¢; 12, 67¢ to 69¢; 14, 73¢ to 78¢; 16, 80¢ to 85¢; 18, 88¢ to 93¢; 20, $1.00 to $1.05; 22, $1.22-$1.31; 24, $1.62-$1.75. Specification grade higher. Base: 30,000 lb.

Extruded Round Rod: M, FS, diam in., ¼ in. to 0.311, 66¢; ⅜ in. to ¾, 50¢; 1¼ to 1.749, 47¢; 2½ to 5 in., 45¢. Other alloys higher. Base: Up to ¾ in., diam, 10,000 lb; ¾ in. to 1¾ in., 20,000 lb; 1¾ in. and larger, 30,000 lb.

Extruded Solid Shapes, Rectangles: M, FS, in weight per ft, for perimeters of less than size indicated, 0.10 to 0.11 lb per ft, per. up to 3.5 in., 59.5¢; 0.22 to 0.25 lb per ft, per. up to 5.9 in., 55¢; 0.50 to 0.59 lb per ft, per. up to 8.6 in., 50.5¢; 1.8 to 2.59 lb per ft, per. up to 19.5 in., 47.5¢ 4 to 6 lb per ft, per. up to 28 in. 46.5¢. Other alloys higher. Base, in weight per ft of shape: Up to ½ lb, 10,000 lb; ½ lb to 1.80 lb, 20,000 lb; 1.80 lb and heavier, 30,000 lb.

Extruded Round Tubing: M, FS, wall thickness, outside diam, in., 0.049 to 0.057, ¼ in. to 5/16, $1.40; 5/16 to ⅜, $1.26; ½ to ⅝, 93¢; 1 to 2 in., 76¢; 0.165 to 0.219, ⅝ to ¾, 61¢; 1 to 2 in., 57¢; 3 to 4 in., 56¢. Other alloys higher. Base, OD in in.: Up to 1½ in., 10,000 lb; 1½ in. to 3 in., 20,000 lb; 3 in. and larger, 30,000 lb.

Nickel and Monel

(Base prices, cents per lb, f.o.b. mill)

	"A" Nickel	Monel
Sheets, cold-rolled	69	53
Strip, cold-rolled	75	56
Rods and bars	65	51
Angles, hot-rolled	65	51
Plates	67	52
Seamless tubes	98	86
Shot and blocks	....	46

Copper, Brass, Bronze

(Cents per lb, freight prepaid on 200 lb, subject to copper import duty)

	Sheets	Rods	Extruded Shapes
Copper	39.43	....	39.03
Copper, h-r	....	35.28	....
Copper, drawn	....	36.53	....
Low brass	37.72	37.41	....
Yellow brass	36.53	36.22	....
Red brass	38.11	37.80	....
Naval brass	41.43	35.49	36.75
Leaded brass	....	30.95	35.11
Com'l bronze	39.03	38.72	....
Manganese bronze	44.93	38.82	40.38
Phosphor bronze	58.02	58.27	....
Muntz metal	39.53	35.09	36.34
Everdur, Herculoy, Olympic, etc.	43.97	42.91	....
Nickel silver 10 pct	47.51	51.63	....
Arch. bronze	....	....	35.11

PRIMARY METALS

(Cents per lb, unless otherwise noted)

Aluminum ingot, 99+%, 10,000 lb. freight allowed	17.50 to 19.00
Aluminum pig	16.50 to 18.00
Antimony, American, Laredo, Tex.	32.00
Beryllium metal, 95%, lumps, beads	$95.00
Beryllium copper, 3.75-4.25% Be, dollars per lb contained Be	$30.00
Beryllium aluminum 5% Be, dollars per lb contained Be	$65.00
Bismuth, ton lots	$2.00
Cadmium, del'd	$2.40
Cobalt, 97-99% (per lb)	$1.80 to $1.87
Copper, electro, Conn. Valley	22.50 to 24.50
Copper, Lake, delivered	24.625
Gold, U. S. Treas., dollars per oz.	$35.00
Indium, 99.8%, dollars per troy oz.	$2.25
Iridium, dollars per troy oz.	$220
Lead St. Louis	15.80
Lead, New York	16.00
Magnesium, 99.8+%, f.o.b. Freeport Tex., 10,000 lb	22.50
Magnesium, sticks, 100 to 500 lb	39.00¢ to 41.00¢
Mercury, dollars per 76-lb flask f.o.b. New York	$85 to $87
Nickel, electro, f.o.b. New York	51.22
Nickel oxide sinter, f.o.b. Copper Cliff, Ont., contained nickel	44.25
Palladium, dollars per troy oz.	$24.00
Platinum, dollars per troy oz.	$100 to $103
Silver, New York, cents per oz.	72.75
Tin, New York	$1.04
Zinc, East St. Louis	17.50
Zinc, New York	18.22
Zirconium copper, 50 pct	$6.20

REMELTED METALS

Brass Ingot

(Cents per lb delivered, carloads)

85-5-5-5 ingot	
No. 115	25.50
No. 120	25.00
No. 123	24.50
80-10-10 ingot	
No. 305	29.50
No. 315	27.00
88-10-2 ingot	
No. 210	40.00
No. 215	37.00
No. 245	31.00
Yellow ingot	
No. 405	21.75
Manganese bronze	
No. 421	29.00

Aluminum Ingot

(Cents per lb, 30,000 lb lots)

95-5 aluminum-silicon alloys	
0.30 copper, max.	29.00-29.50
0.60 copper, max.	28.50-29.00
Piston alloys (No. 122 type)	27.00-27.50
No. 12 alum. (No. 2 grade)	26.50-27.00
108 alloy	27.00-27.50
195 alloy	28.00-28.50
13 alloy	28.50-29.00
AXS-679	27.50-28.00

Steel deoxidizing aluminum, notch-bar granulated or shot

Grade 1—95-97½%	27.50-28.00
Grade 2—92-95%	26.50-27.00
Grade 3—90-92%	25.50-26.00
Grade 4—85-90%	25.00-25.50

ELECTROPLATING SUPPLIES

Anodes

(Cents per lb, freight allowed, in 500 lb lots)

Copper	
Cast, oval, 15 in. or longer	39½
Electrodeposited	33⅜
Rolled, oval, straight, delivered	38⅞
Forged ball anodes	43
Brass, 80-20	
Cast, oval, 15 in. or longer	34¾
Zinc, oval	26½
Ball anodes	25½
Nickel 99 pct plus	
Cast	68.00
Rolled, depolarized	69.00
Cadmium	$2.55
Silver 999 fine, rolled, 100 oz lots, per troy oz, f.o.b. Bridgeport, Conn.	79½

Chemicals

(Cents per lb, f.o.b. shipping point)

Copper cyanide, 100 lb drum	52.15
Copper sulfate, 99.5 crystals, bbl.	12.85
Nickel salts, single or double, 4-100 lb bags, frt allowed	20½
Nickel chloride, 375 lb drum	27½
Silver cyanide, 100 oz lots, per oz.	61¼
Sodium cyanide, 96 pct domestic 200 lb drums	19.25
Zinc cyanide, 100 lb drums	45.85

SCRAP METALS

Brass Mill Scrap

(Cents per pound; add ½¢ per lb for shipments of 20,000 to 40,000 lb; add 1¢ for more than 40,000 lb)

	Heavy	Turnings
Copper	21½	20¾
Yellow brass	19⅛	17⅞
Red brass	20⅛	19⅜
Comm. bronze	20½	19¾
Mang. bronze	17¼	16¼
Brass rod ends	18⅞	....

Custom Smelters' Scrap

(Cents per pound, carload lots, delivered to refinery)

No. 1 copper wire	21.75
No. 2 copper wire	20.75
Light copper	19.75
Refinery brass	20.00*
Radiators	15.50

*Dry copper content.

Ingot Makers' Scrap

(Cents per pound, carload lots, delivered to producer)

No. 1 copper wire	21.75
No. 2 copper wire	20.75
Light copper	19.75
No. 1 composition	19.00
No. 1 comp turnings	18.75
Rolled brass	17.00
Brass pipe	18.50
Radiators	15.50
Heavy yellow brass	14.50-14.75
Aluminum	
Mixed old cast	16.00
Mixed old clips	16.50
Mixed turnings, dry	15.50
Pots and pans	16.00
Low copper	18.50

Dealers' Scrap

(Dealers' buying prices, f.o.b. New York in cents per pound)

Copper and Brass

No. 1 heavy copper and wire	20½—21
No. 2 heavy copper and wire	19½—20
Light copper	18½—19
Auto radiators (unsweated)	13¾—14
No. 1 composition	17 —17½
No. 1 composition turnings	16½—17
Clean red car boxes	15 —15½
Cocks and faucets	15 —15½
Mixed heavy yellow brass	12 —12½
Old rolled brass	13¼—13¾
Brass pipe	15½—16
New soft brass clippings	17 —17½
Brass rod ends	15¾—16
No. 1 brass rod turnings	15½—15¾

Aluminum

Alum. pistons and struts	9½—10
Aluminum crankcases	12 —12½
2S aluminum clippings	15 —15½
Old sheet and utensils	12 —12½
Borings and turnings	8½
Misc. cast aluminum	12 —12½
Dural clips (24S)	12 —12½

Zinc

New zinc clippings	13½—14
Old zinc	11¼—11½
Zinc routings	8¼— 8¾
Old die cast scrap	8¼— 8¾

Nickel and Monel

Pure nickel clippings	50 —60
Clean nickel turnings	47 —57
Nickel anodes	50 —60
Nickel rod ends	50 —60
New Monel Clippings	17 —21
Clean Monel turnings	15 —17
Old sheet Monel	16 —20
Inconel clippings	22 —26
Nickel silver clippings, mixed	13 —14
Nickel silver turnings, mixed	12 —13

Lead

Soft scrap, lead	13½—14
Battery plates (dry)	8 — 8½

Magnesium

Segregated solids	9 —10
Castings	5½— 6½

Miscellaneous

Block tin	78 —80
No. 1 pewter	58 —60
No. 1 auto babbitt	50 —52
Mixed common babbitt	13 —13½
Solder joints	16½—17
Siphon tops	46 —48
Small foundry type	16½—17
Monotype	15½—16
Lino. and stereotype	14½—15
Electrotype	13¾—14¼
New type shell cuttings	18 —18½
Hand picked type shells	6½— 7
Lino. and stereo. dross	4¾— 5¼
Electro. dross	3¼— 3½

MARKETS—PRICES—TRENDS

SCRAP
Iron & Steel

Steelmaking Grade Prices Being Tested

Current prices for heavy melting steel grades are being strongly tested in several major market areas this week. Only at Cincinnati was there an advance in No. 1 heavy melting steel. There, mills told brokers to go up $2.00 a ton to get material.

In some districts brokers are filling old higher priced orders because of trouble with later lower priced orders on No. 1 heavy melting steel. Automotive lists are bringing higher prices. Blast furnace grades have been advanced at several spots.

Meanwhile mill inventories are still reasonably good and foreign scrap is coming in to the East and to Pittsburgh in enough quantity to offset some of the demand. Foundry grades, sparked by new railroad car orders, are strong and generally higher. Pressure for conversion steel at Pittsburgh is forcing some higher bundle prices but still not enough to be representative there.

PITTSBURGH—Consumers of shoveling turnings have agreed to pay $38.00 for this grade, an increase of $1.00 from last week. The new price establishes a differential of $6.00 between shoveling turnings and No. 1 heavy melting steel. No. 1 grade continues available at $44.00, but orders at higher prices are still outstanding. Everybody seems to have been on the books for heavy tonnages before the "formula" price went into effect one month ago. The mills are attempting to establish a differential on low phos in relation to No. 1 steel, but thus far the low phos market continues fairly strong.

CHICAGO—Scrap prices in the Chicago area remained firm this week. Brokers are experiencing difficulty filling orders for No. 1 heavy melting steel and a few are reported to be paying $40.00 per gross ton. As yet no consumer is reported to be paying more than the formula price of $40.00. Foundry items are still in heavy demand. It seems that stability has been achieved in this market especially in the openhearth grades.

PHILADELPHIA—The scrap market here is rather steady with prices unchanged in the steelmaking grades. Foundry demand, however, is continuing strong with the result that some cast iron scrap is higher this week. Rail crops are a dollar stronger but they would be scarce at any figure. Cast iron carwheels are very scarce in the market because they are being earmarked back to the wheelmakers.

NEW YORK—The mills' grip on steelmaking grade prices did not relax and they did not budge from last week's levels. There was some feeling that the formula price front might crack when mill stocks ran low and mills had to revert to the old competitive laws of supply and demand. Movement of scrap was reported as fair and demand for cast grades was turbulent. The latter grades stayed on their high plateau with the exception of heavy breakable cast which went up $1.00. Shoveling turnings advanced $1.00 to $25.50 to $26.50.

DETROIT—While the upward surge of scrap prices here appears to be checked for the moment, mill resistance has already been met by some dealer resistance according to trade sources. Industrial lists are being awarded this week. Several lists have already gone for higher prices than those given in THE IRON AGE this week. An upward adjustment of $3.50 this week in blast furnace grades brings these prices in line with current buying prices. Cast grades continue very strong.

CLEVELAND—Despite some signs of a weaker undertone, the market here and in the Valley is showing plenty of fight. Reports of up-grading and the fact that some brokers are just now starting to ship on $44.00 orders are adding to the confusion. Some consumers have good inventories and at least one is embargoed, but at press time, some orders at the $44.00 level were being given out with a 45-day expiration date. Competition from the foundries for the premium grades is stimulating a certain amount of this activity.

ST. LOUIS—The scrap iron market in the St. Louis industrial district is quiet. Steel mills are out of the market following recent heavy commitments. Foundry grades are strong and No. 1 machinery cast moved $1.00 higher to $45.00 to $47.00. Local yards are well cleaned of material and brokers are having difficulty getting large commitments to fill orders.

CINCINNATI—Some consumers let their brokers raise buying prices here early this week in an effort to pick up additional tonnage, particularly No. 1 heavy melting steel. With the exception of No. 2 bundles, all grades are strong. Some dealers are continuing to hold out for a possible rise in the market, and the hope is that new prices will permit brokers to get at some of this tonnage, which thus far has moved only in small lots. Foundry grades are moving freely despite price advances.

BOSTON—The scrap market here is rather quiet except for the foundry grades. Demand for the cast items has pushed up prices of mixed cupola cast $1.50 to $33.50 to $34.00 per gross ton, and heavy breakable cast 50¢ to $31.00 to $31.50. No. 2 heavy melting steel and machine shop turnings are also up 50¢.

BIRMINGHAM—The scrap market continued steady to strong this week, but with very little buying in quantities. Pipe companies ceased buying No. 1 cast, but indicated they have a lot bought that has not yet arrived and they do not want to buy any more until they see where they stand. Prices in all categories were unchanged with last week.

BUFFALO—Cast prices advanced $3.00 a ton on sales of cupola within a range of $41.00 to $42.00 a ton. While cast reflected the strength prevalent in other centers, the market for steelmaking grades leveled off at recently established formula prices. Top mills were reported as adhering to the so-called voluntary ceilings although some of the smaller mills were expected to encounter difficulty buying within the ranges. Some dealers report difficulty maintaining full operations because of the manpower pinch. Workers are leaving scrap yards for better paying yards.

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Iron and Steel

SCRAP PRICES

Going prices as obtained in the trade by THE IRON AGE, based on representative tonnages. All prices are per gross ton delivered to consumer unless otherwise noted.

Pittsburgh

No. 1 hvy. melting	$43.50 to $44.00
No. 2 hvy. melting	39.00 to 39.50
No. 1 bundles	45.50 to 46.00
No. 2 bundles	38.50 to 39.00
Machine shop turn.	33.50 to 34.00
Mixed bor. and ms. turns	33.50 to 34.00
Shoveling turnings	37.50 to 38.00
Cast iron borings	35.50 to 36.00
Low phos. plate	49.50 to 50.00
Heavy turnings	42.50 to 43.00
No. 1 RR. hvy. melting	44.00 to 45.00
Scrap rails, random lgth.	52.50 to 53.00
Rails 2 ft and under	55.00 to 56.00
RR. steel wheels	52.00 to 53.00
RR. spring steel	52.00 to 53.00
RR. couplers and knuckles	52.00 to 53.00
No. 1 machinery cast	51.50 to 52.00
Mixed yard cast.	45.50 to 46.00
Heavy breakable cast.	41.50 to 42.00
Malleable	55.00 to 56.00

Chicago

No. 1 hvy. melting	$39.50 to $40.00
No. 2 hvy. melting	37.50 to 38.00
No. 1 factory bundles	39.50 to 40.00
No. 1 dealers' bundles	39.50 to 40.00
No. 2 dealers' bundles	34.00 to 35.00
Machine shop turn.	28.50 to 29.50
Mixed bor. and turn.	28.50 to 29.50
Shoveling turnings	30.00 to 31.00
Cast iron borings	30.00 to 31.00
Low phos. forge crops	49.00 to 50.00
Low phos. plate	48.00 to 49.00
No. 1 RR. hvy. melting	43.50 to 44.50
Scrap rails, random lgth.	54.50 to 55.50
Rerolling rails	60.00 to 61.00
Rails 2 ft and under	61.00 to 62.00
Locomotive tires, cut	50.00 to 51.00
Cut bolsters & side frames	49.00 to 50.00
Angles and splice bars	54.00 to 55.00
RR. steel car axles	74.00 to 75.00
RR. couplers and knuckles	49.00 to 50.00
No. 1 machinery cast.	50.00 to 51.00
No. 1 agricul. cast.	46.00 to 47.00
Heavy breakable cast.	38.00 to 39.00
RR. grate bars	38.00 to 39.00
Cast iron brake shoes	41.00 to 42.00
Cast iron car wheels	42.00 to 43.00
Malleable	57.00 to 58.00

Philadelphia

No. 1 hvy. melting	$38.00 to $39.00
No. 2 hvy. melting	35.00 to 36.00
No. 1 bundles	38.00 to 39.00
No. 2 bundles	31.00 to 32.00
Machine shop turn.	27.00 to 28.00
Mixed bor. and turn.	25.00 to 26.00
Shoveling turnings	32.00 to 33.00
Low phos. punchings, plate	44.00 to 45.00
Low phos. 5 ft and under.	44.00 to 45.00
Low phos. bundles	41.00 to 42.00
Hvy. axle forge turn.	38.00 to 39.00
Clean cast chem. borings	39.00 to 40.00
RR. steel wheels	46.00 to 47.00
RR. spring steel	46.00 to 47.00
Rails 18 in. and under	53.00 to 54.00
No. 1 machinery cast.	46.00 to 47.00
Mixed yard cast.	40.00 to 41.00
Heavy breakable cast.	40.00 to 41.00
Cast iron carwheels	47.00 to 48.00
Malleable	52.00 to 53.00

Cleveland

No. 1 hvy. melting	$41.00 to $41.50
No. 2 hvy. melting	38.00 to 38.50
No. 1 busheling	41.00 to 41.50
No. 1 bundles	41.00 to 41.50
No. 2 bundles	28.00 to 28.50
Machine shop turn.	30.00 to 30.50
Mixed bor. and turn.	33.00 to 33.50
Shoveling turnings	33.00 to 33.50
Cast iron borings	33.00 to 33.50
Low phos. 2 ft and under	43.50 to 44.00
Steel axle turn.	41.00 to 41.50
Drop forge flashings	41.00 to 41.50
No. 1 RR. hvy. melting	43.50 to 44.00
Rails 3 ft and under	63.00 to 63.50
Rails 18 in. and under	64.00 to 64.50
No. 1 machinery cast.	53.00 to 54.00
RR cast.	53.00 to 54.00
RR. grate bars	43.00 to 44.00
Stove plate	47.00 to 48.00
Malleable	65.00 to 66.00

Youngstown

No. 1 hvy. melting	$43.50 to $44.00
No. 2 hvy. melting	40.50 to 41.00
No. 1 bundles	43.50 to 44.00
No. 2 bundles	$38.50 to $39.00
Machine shop turn.	33.50 to 34.00
Shoveling turnings	33.50 to 34.00
Cast iron borings	33.50 to 34.00
Low phos. plate	46.00 to 46.50

Buffalo

No. 1 hvy. melting	$41.00 to $42.00
No 2 hvy. melting	37.50 to 38.50
No 1 busheling	37.50 to 38.50
No. 1 bundles	39.50 to 40.00
No. 2 bundles	36.00 to 36.50
Machine shop turn.	30.00 to 31.00
Mixed bor. and turn.	30.00 to 31.00
Shoveling turnings	32.00 to 34.00
Cast iron borings	30.00 to 31.00
Low phos. plate	42.00 to 43.00
Scrap rails, random lgth.	44.00 to 45.00
Rails 2 ft and under	48.00 to 50.00
RR. steel wheels	47.00 to 48.00
RR. spring steel	47.00 to 48.00
RR. couplers and knuckles	47.00 to 48.00
No. 1 machinery cast.	44.00 to 45.00
No. 1 cupola cast.	41.00 to 42.00
Small indus. malleable	44.00 to 45.00

Birmingham

No. 1 hvy. melting	$34.50 to $35.00
No. 2 hvy. melting	31.00 to 32.00
No. 2 bundles	29.00 to 30.00
No. 1 busheling	31.00 to 32.00
Machine shop turn.	27.00 to 28.00
Shoveling turnings	29.00 to 30.00
Cast iron borings	25.00 to 26.00
Bar crops and plate	41.00 to 42.00
Structural and plate	41.00 to 42.00
No. 1 RR. hvy. melting	40.00 to 41.00
Scrap rails, random lgth.	43.00 to 44.00
Rerolling rails	48.00 to 49.00
Rails 2 ft and under	48.00 to 49.00
Angles & splice bars	47.00 to 48.00
Std. steel axles	44.00 to 45.00
No. 1 cupola cast.	51.00 to 52.00
Stove plate	46.00 to 47.00
Cast iron carwheels	37.00 to 38.00

St. Louis

No. 1 hvy. melting	$39.00 to $40.00
No. 2 hvy. melting	36.00 to 37.00
No. 2 bundled sheets	34.00 to 35.00
Machine shop turn.	27.50 to 28.50
Shoveling turnings	29.00 to 30.00
Rails, random lengths	50.00 to 51.00
Rails 3 ft and under	54.00 to 56.00
Locomotive tires, uncut	47.00 to 48.00
Angles and splice bars	54.00 to 55.00
Std. steel car axles	76.00 to 78.00
RR. spring steel	49.00 to 50.00
No. 1 machinery cast.	45.00 to 47.00
Hvy. breakable cast.	40.00 to 42.00
Cast iron brake shoes	43.00 to 45.00
Stove plate	38.00 to 39.00
Cast iron car wheels	48.00 to 49.00
Malleable	53.00 to 55.00

New York

Brokers' buying prices per gross ton, on cars:

No. 1 hvy.melting	$32.50 to $33.00
No. 2 hvy. melting	29.00 to 30.00
No. 2 bundles	28.00 to 28.50
Machine shop turn.	23.00 to 24.00
Mixed bor. and turn.	23.00 to 24.00
Shoveling turnings	25.50 to 26.50
Clean cast chem. bor.	34.00 to 35.00
No. 1 machinery cast.	36.00 to 37.00
Mixed yard cast.	34.00 to 35.00
Charging box cast.	34.00 to 35.00
Heavy breakable cast.	34.00 to 35.00
Unstrp. motor blocks	30.00 to 31.00

Boston

Brokers' buying prices per gross ton, on cars:

No. 1 hvy. melting	$32.00
No. 2 hvy. melting	$26.50 to 27.00
No. 1 bundles	32.00
No. 2 bundles	$25.50 to $26.00
Machine shop turn.	22.50 to 23.00
Mixed bor. and turn.	22.00 to 22.50
Shoveling turnings	24.50 to 25.00
No. 1 busheling	31.50 to 32.00
Clean cast chem. borings	29.00 to 30.00
No. 1 machinery cast.	35.00 to 36.00
Mixed cupola cast.	33.50 to 34.00
Heavy breakable cast.	31.00 to 31.50
Stove plate	31.00 to 31.50

Detroit

Brokers' buying prices per gross ton, on cars:

No. 1 hvy. melting	$37.00 to $37.50
No. 2 hvy. melting	30.00 to 31.00
No. 1 bundles	37.00 to 37.50
New busheling	37.00 to 37.50
Flashings	37.50 to 38.00
Machine shop turn.	29.00 to 29.50
Mixed bor. and turn.	29.00 to 29.50
Shoveling turnings	31.00 to 31.50
Cast iron borings	31.00 to 31.50
Low phos. plate	39.00 to 40.00
No. 1 cupola cast.	42.00 to 43.00
Heavy breakable cast.	35.00 to 36.00
Stove plate	36.00 to 37.00
Automotive cast.	45.00 to 46.00

Cincinnati

Per gross ton, f.o.b. cars:

No. 1 hvy. melting	$41.50 to $42.00
No. 2 hvy. melting	36.50 to 37.00
No. 1 bundles	41.50 to 42.00
No. 2 bundles, black	36.50 to 37.00
No. 2 bundles, mixed	36.50 to 37.00
Machine shop turn.	25.50 to 26.00
Mixed bor. and turn.	27.50 to 28.00
Shoveling turnings	28.50 to 29.00
Cast iron borings	28.50 to 29.00
Low phos. 18 in. under	52.00 to 53.00
Rails, random lengths	53.00 to 54.00
Rails, 18 in. and under	61.00 to 62.00
No. 1 cupola cast.	54.00 to 55.00
Hvy. breakable cast.	46.00 to 47.00
Drop broken cast.	57.00 to 58.00

San Francisco

No. 1 hvy. melting	$26.50
No. 2 hvy. melting	24.50
No. 1 bundles	26.50
No. 2 bundles	22.50
No. 3 bundles	19.50
Machine shop turn.	13.00
Elec. fur. 1 ft and under	36.00
No. 1 RR. hvy. melting	26.50
Scrap rails, random lgth.	26.50
No. 1 cupola cast.	$43.00 to 46.00

Los Angeles

No. 1 hvy. melting	$26.50
No. 2 hvy. melting	24.50
No. 1 bundles	26.50
No. 2 bundles	22.50
No. 3 bundles	19.50
Mach. shop turn.	13.00
Elec. fur. 1 ft and under	38.00
No. 1 RR. hvy. melting	26.50
Scrap rails, random lgth.	26.50
No. 1 cupola cast.	$43.00 to 45.00

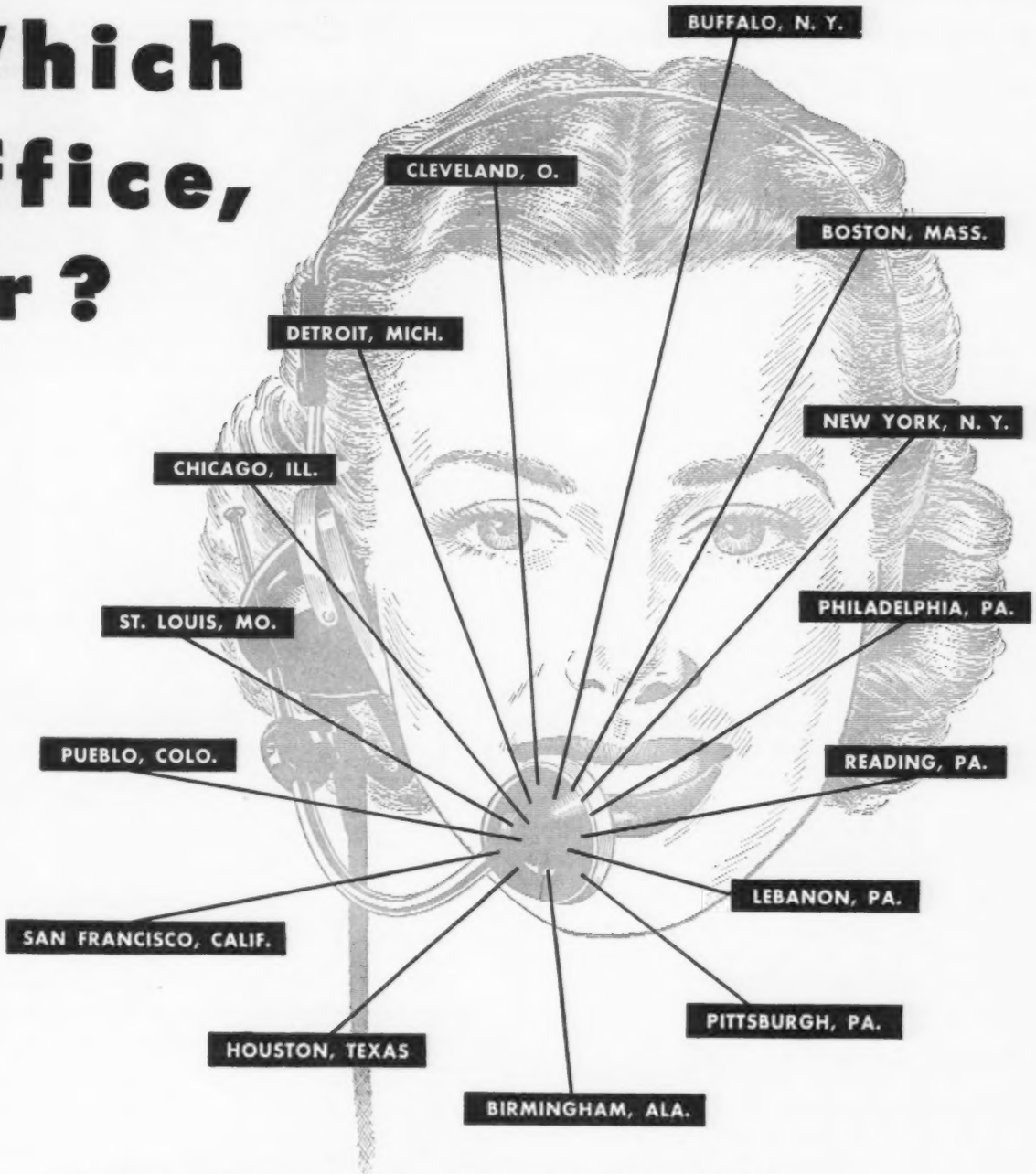
Seattle

No. 1 hvy. melting	$24.00
No. 2 hvy. melting	24.00
No. 1 bundles	22.00
No. 2 bundles	22.00
No. 3 bundles	18.00
Elec. fur. 1 ft and under	$29.00 to 30.00
RR. hvy. melting	25.00
No. 1 cupola cast	35.00
Heavy breakable cast.	25.00

Hamilton, Ont.

No. 1 hvy. melting	$30.00
No. 1 bundles	30.00
No. 2 bundles	29.50
Mechanical bundles	28.00
Mixed steel scrap	26.00
Mixed bor. and turn.	23.00
Rails, remelting	30.00
Rails, rerolling	33.00
Bushelings	24.50
Bush., new fact, prep'd.	29.00
Bush., new fact, unprep'd.	23.00
Short steel turnings	23.00
Cast scrap	40.00

Which office, sir?



Since 1889 Luria Brothers and Company, Inc. have pursued a policy of better service made possible by years of "know how" and personnel who have the desire to please.

The expansion of our organization, with offices located in 15 major cities, is in accordance with our policy to give better service to our customers.

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LEADERS IN IRON AND STEEL SCRAP SINCE 1889

Comparison of Prices

Steel prices on this page are the average of various f.o.b. quotations of major producing areas: Pittsburgh, Chicago, Gary, Cleveland, Youngstown.

Flat-Rolled Steel (cents per pound)	Sept.26, 1950	Sept.19, 1950	Aug.29, 1950	Sept.27 1949
Hot-rolled sheets	3.35	3.35	3.35	3.25
Cold-rolled sheets	4.10	4.10	4.10	4.00
Galvanized sheets (10 ga)	4.40	4.40	4.40	4.40
Hot-rolled strip	3.25	3.25	3.25	3.25
Cold-rolled strip	4.21	4.21	4.21	4.038
Plate	3.50	3.50	3.50	3.40
Plates wrought iron	7.85	7.85	7.85	7.85
Stains C-R strip (No. 302)	34.50	34.50	34.50	33.00
Tin and Terneplate: (dollars per base box)				
Tinplate (1.50 lb) cokes.	$7.50	$7.50	$7.50	$7.75
Tinplate, electro (0.50 lb)	6.60	6.60	6.60	6.70
Special coated mfg. ternes	6.35	6.35	6.35	6.65
Bars and Shapes: (cents per pound)				
Merchant bars	3.45	3.45	3.45	3.35
Cold-finished bars	4.145	4.145	4.145	3.995
Alloy bars	3.95	3.95	3.95	3.75
Structural shapes	3.40	3.40	3.40	3.25
Stainless bars (No. 302).	30.00	30.00	30.00	28.50
Wrought iron bars	9.50	9.50	9.50	9.50
Wire: (cents per pound)				
Bright wire	4.50	4.50	4.50	4.15
Rails: (dollars per 100 lb)				
Heavy rails	$3.40	$3.40	$3.40	$3.20
Light rails	3.75	3.75	3.75	3.55
Semifinished Steel: (dollars per net ton)				
Rerolling billets	$54.00	$54.00	$54.00	$52.00
Slabs, rerolling	54.00	54.00	54.00	52.00
Forging billets	63.00	63.00	63.00	61.00
Alloy blooms, billets, slabs	66.00	66.00	66.00	63.00
Wire Rod and Skelp: (cents per pound)				
Wire rods	3.85	3.85	3.85	3.40
Skelp	3.15	3.15	3.15	3.25

Price advances over previous week are printed in Heavy Type; declines appear in *Italics*.

Pig Iron: (per gross ton)	Sept.26, 1950	Sept.19, 1950	Aug.29, 1950	Sept.27 1949
No. 2, foundry, del'd Phila.	$51.76	$51.76	$51.76	$50.42
No. 2, Valley furnace	49.50	46.50	46.50	46.50
No. 2, Southern Cin'ti	50.25	49.08	49.08	46.08
No. 2, Birmingham	43.55	42.38	42.38	39.38
No. 2, foundry, Chicago†	49.50	46.50	46.50	46.50
Basic del'd Philadelphia	50.92	50.92	50.92	49.92
Basic, Valley furnace	49.00	46.00	46.00	46.00
Malleable, Chicago†	49.50	46.50	46.50	46.50
Malleable, Valley	49.50	46.50	46.50	46.50
Charcoal, Chicago	72.56	68.56	68.56	68.56
Ferromanganese‡	173.40	173.40	173.40	173.40

†The switching charge for delivery to foundries in the Chicago district is $1 per ton.
‡Average of U. S. prices quoted on Ferroalloy page.

Scrap: (per gross ton)				
Heavy melt'g steel, P'gh.	$43.75	$43.75	$43.75	$29.75
Heavy melt'g steel, Phila.	38.50	38.50	38.50	25.50
Heavy melt'g steel, Ch'go	*39.75*	40.00	40.50	28.50
No. 1 hy. com. sh't, Det.	*37.25*	37.75	40.50	23.50
Low phos. Young'n	46.25	46.25	46.75	31.75
No. 1 cast, Pittsburgh	51.75	51.75	48.75	39.50
No. 1 cast, Philadelphia	46.50	45.50	43.50	39.00
No. 1 cast, Chicago	50.50	49.50	50.50	42.50
Coke: Connellsville: (per net ton at oven)				
Furnace coke, prompt	$14.25	$14.25	$14.25	$14.25
Foundry coke, prompt	16.25	16.25	16.25	15.75
Nonferrous Metals: (cents per pound to large buyers)				
Copper, electro, Conn.	23.80	23.80	22.60	17.625
Copper, Lake, Conn.	24.625	24.625	24.625	17.75
Tin, Straits, New York	$1.04†	$1.01*	$1.02	95.00
Zinc, East St. Louis	17.50	17.50	15.00	10.00
Lead, St. Louis	15.80	15.80	13.80	14.60
Aluminum, virgin	18.25	17.50	17.50	17.00
Nickel, electrolytic	51.22	51.22	51.22	42.93
Magnesium, ingot	22.50	22.50	22.50	20.50
Antimony, Laredo, Tex.	32.00	32.00	24.50	38.50

†Tentative. *Revised.

Composite Prices

Starting with the issue of May 12, 1949, the weighted finished steel composite was revised for the years 1941 to date. The weights used are based on the average product shipments for the 7 years 1937 to 1940 inclusive and 1946 to 1948 inclusive. The use of quarterly figures has been eliminated because it was too sensitive. (See p. 139 of May 12, 1949, issue.)

	Finished Steel Base Price	Pig Iron	Scrap Steel
Sept. 26, 1950	3.837¢ per lb.	$48.80 per gross ton	*$40.67* per gross ton
One week ago	3.837¢ per lb.	46.61 per gross ton	40.75 per gross ton
One month ago	3.837¢ per lb.	46.61 per gross ton	40.92 per gross ton
One year ago	3.705¢ per lb.	45.88 per gross ton	27.92 per gross ton

	Finished Steel Base Price High	Finished Steel Base Price Low	Pig Iron High	Pig Iron Low	Scrap Steel High	Scrap Steel Low
1950	3.837¢ Jan. 3	3.837¢ Jan. 3	$48.80 Sept. 26	$45.88 Jan. 3	$41.58 Aug. 22	$26.25 Jan. 3
1949	3.837¢ Dec. 27	3.3705¢ May 3	46.87 Jan. 18	45.88 Sept. 6	43.00 Jan. 4	19.33 June 28
1948	3.721¢ July 27	3.193¢ Jan. 1	46.91 Oct. 12	39.58 Jan. 6	43.16 July 27	39.75 Mar. 9
1947	3.193¢ July 29	2.848¢ Jan. 1	37.98 Dec. 30	30.14 Jan. 7	42.58 Oct. 28	29.50 May 20
1946	2.848¢ Dec. 31	2.464¢ Jan. 1	30.14 Dec. 10	25.37 Jan. 1	31.17 Dec. 24	19.17 Jan. 1
1945	2.464¢ May 29	2.396¢ Jan. 1	25.37 Oct. 23	23.61 Jan. 2	19.17 Jan. 2	18.92 May 22
1944	2.396¢	2.396¢	$23.61	$23.61	19.17 Jan. 11	15.76 Oct. 24
1943	2.396¢	2.396¢	23.61	23.61	$19.17	$19.17
1942	2.396¢	2.396¢	23.61	23.61	19.17	19.17
1941	2.396¢	2.396¢	$23.61 Mar. 20	$23.45 Jan. 2	$22.00 Jan. 7	$19.17 Apr. 10
1940	2.30467¢ Jan. 2	2.24107¢ Apr. 16	23.45 Dec. 23	22.61 Jan. 2	21.83 Dec. 30	16.04 Apr. 9
1939	2.35367¢ Jan. 3	2.26689¢ May 16	22.61 Sept. 19	20.61 Sept. 12	22.50 Oct. 3	14.08 May 16
1938	2.58414¢ Jan. 4	2.27207¢ Oct. 18	23.25 June 21	19.61 July 6	15.00 Nov. 22	11.00 June 7
1937	2.58414¢ Mar. 9	2.32263¢ Jan. 4	32.25 Mar. 9	20.25 Feb. 16	21.92 Mar. 30	12.67 June 9
1936	2.32263¢ Dec. 28	2.05200¢ Mar. 10	19.74 Nov. 24	18.73 Aug. 11	17.75 Dec. 21	12.67 June 8
1935	2.07542¢ Oct. 1	2.06492¢ Jan. 8	18.84 Nov. 5	17.83 May 14	13.42 Dec. 10	10.33 Apr. 29
1932	1.89196¢ July 5	1.83910¢ Mar. 1	14.81 Jan. 5	13.56 Dec. 6	8.50 Jan. 12	6.43 July 5
1929	2.31773¢ May 28	2.26498¢ Oct. 29	18.71 May 14	18.21 Dec. 17	17.58 Jan. 29	14.08 Dec. 8

Weighted index based on steel bars, shapes, plates, wire, rails, black pipe, hot and cold-rolled sheets and strip, representing major portion of finished steel shipment. Index recapitulated in Aug. 28, 1941, issue and in May 12, 1949.

Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

Average of No. 1 heavy melting steel scrap delivered to consumers at Pittsburgh, Philadelphia and Chicago.

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IRON AGE

STEEL PRICES

Smaller numbers in price boxes indicate producing companies. For main office locations, see key on facing page.
Base prices at producing points apply only to sizes and grades produced in these areas. Prices are in cents per lb unless otherwise noted. Extras apply.

	Pittsburgh	Chicago	Gary	Cleveland	Canton Massillon	Middletown	Youngstown	Bethlehem	Buffalo	Conshohocken	Johnstown	Sparrows Point	Granite City	Detroit
INGOTS Carbon forging, net ton	$50.00[1]													$50.00[11]
Alloy, net ton	$51.00[1-17]													$51.00[11]
BILLETS, BLOOMS, SLABS Carbon, rerolling, net ton	$53.00[1]	$53.00[1]	$53.00[1]				$57.00[13]		$53.00[3]	$62.00[26]	$53.00[3]			
Carbon forging billets, net ton	$63.00[1]	$63.00[1-4]	$63.00[1-8]	$63.00[4]			$63.00[25]		$63.00[3-4]	$68.00[26]	$63.00[3]			$68.00[11]
Alloy, net ton	$66.00[1-17]	$66.00[1-4]	$66.00[1]		$66.00[4-42]		$66.00[13]	$66.00[3]	$66.00[3-4]	$70.00[26]	$66.00[3]			$66.00[11]
PIPE SKELP	3.15[1]						3.15[1-4]							
WIRE RODS	3.85[2-18]	3.85[2-4-33]	3.85[6]	3.85[2]			3.85[6]				3.85[4]	3.95[3]		
SHEETS Hot-rolled (18 ga. & hvr.)	3.35[1-5-9-15]	3.35[23]	3.35[1-6-8]	3.35[4-5]			3.35[1-4-6] 3.50[13]		3.35[3]	3.60[26]		3.35[3]		3.55[12] 4.15[47]
Cold-rolled	4.10[1-5-7-9-15] 5.10[63]		4.10[1-6-8]	4.10[4-15]		4.10[7]	4.10[1-6]		4.10[3]			4.10[3]	4.30[22]	4.30[12]
Galvanized (10 gage)	4.40[1-9-15]		4.40[1-8]		4.40[4]		4.65[64] 4.75[44]					4.40[3]		
Enameling (12 gage)	4.40[1]		4.40[1-8]	4.40[4]		4.40[7]	4.40[6] 4.90[26]						4.60[22]	4.70[12]
Long ternes (10 gage)	4.80[9-15]		4.80[1]			4.80[7]	4.80[64]							
Hi Str. low alloy, h.r.	5.05[1-5-9]	5.05[1]	5.05[1-6-8]	5.05[4-5]			5.05[1-4-6-13]		5.05[3]	5.05[26]		5.05[3]		5.25[12]
Hi str. low alloy, c.r.	6.20[1-5-9]		6.20[1-6-8]	6.20[4-5]			6.20[4-6-13]		6.20[3]			6.20[3]		6.40[12]
Hi str. low alloy, galv.	6.75[1]											6.75[3]		
STRIP Hot-rolled	3.25[5-7-9] 3.50[28-41]	3.25[3-66]	3.25[1-6-8]	3.25[5]			3.25[1-4-6] 3.50[13]		3.25[3]	3.50[26]		3.25[3]		3.45[12] 4.05[47]
Cold-rolled	4.15[5-7-9] 4.50[63]	4.30[8] 4.50[66]	4.30[8]	4.15[2-5]		4.15[7]	4.15[1-6-48-49] 4.50[13-40]		4.15[3]			4.15[3]		4.35[12] 4.75[68-81] 4.95[47]
Hi str. low alloy, h.r.	4.95[9]		4.95[1-6-8]	4.95[5]			4.95[1-4-6-13]		4.95[4]	4.95[26]		4.95[3]		5.15[12]
Hi Str. low alloy, c.r.	6.20[9]			6.20[2-5]			6.20[1-6-13]		6.40[3]			6.40[3]		6.40[12]
TINPLATE† Cokes, 1.50-lb base box 1.25 lb, deduct 20¢	$7.50[1-5-9-15]		$7.50[1-6-8]				$7.50[4]					$7.60[3]	$7.70[22]	
Electrolytic 0.25, 0.50, 0.75 lb box	Deduct $1.15, 90¢ and 65¢ respectively from 1.50-lb coke base box price													
BLACKPLATE, 29 gage Hollowware enameling	5.30[1-5-15]		5.30[1-6]				5.30[4]					5.40[3]	5.50[22]	
BARS Carbon steel	3.45[1-5-9]	3.45[1-4-23]	3.45[1-6-8]	3.45[4]	3.45[4]		3.45[1-4-6]		3.45[3-4]		3.45[3]			3.65[12]
Reinforcing‡	3.45[1-5]	3.45[4]	3.45[1-6-8]	3.45[4]			3.45[1-4-6]		3.45[3-4]		3.45[3]	3.45[3]		
Cold-finished	4.10[5] 4.15[2-4-17-52-69-71]	4.15[2-23-69-70]	4.15[1-73-74]	4.15[2-61]	4.15[4-32-82]		4.15[6-10-57]		4.15[70]					4.35[12] 4.30[84]
Alloy, hot-rolled	3.95[1-17]	3.95[1-4-23]	3.95[1-6-8]		3.95[4]		3.95[1-6-25]	3.95[3]	3.95[3-4]		3.95[3]			4.25[12]
Alloy, cold-drawn	4.90[2-17-52-69-71]	4.90[2-23-69-70]	4.90[1-73-74]	4.90[2-61]	4.90[4-42-82]		4.90[6-25-57]	4.90[3]	4.90[3-70]					5.05[84]
Hi str. low alloy, h.r.	5.20[1-5]		5.20[1-6-8]	5.20[4]			5.20[1-6]	5.20[3]	5.20[3]		5.20[3]			5.40[12]
PLATE Carbon steel	3.50[1-5]	3.50[1]	3.50[1-6-8]	3.50[4]			3.50[1-13]		3.50[3]	3.75[26]	3.50[3]	3.50[3]		3.75[12]
Floor plates	4.55[1]	4.55	4.55[2]	4.55[5]						4.55[26]				
Alloy	4.40[1]	4.40[1]	4.40[1]				4.40[13]			4.55[26]	4.40	4.40[3]		
Hi Str. low alloy	5.35[1-5]	5.35[1]	5.35[1-3]	5.35[4-5]			5.35[6]			5.35[26]	5.35[3]	5.35[3]		5.60[12]
SHAPES, Structural	3.40[1-5-9]	3.40[1-23]	3.40[1-6-8]					3.45[3]	3.45[3]		3.45[3]			
Hi str. low alloy	5.15[1-5]	5.15[1]	5.15[1-6-8]				5.15[6]	5.20[3]	5.20[3]		5.20[3]			
MANUFACTURERS' WIRE Bright	4.50[2-5-18]	4.50[2-4-12-33-34]		4.50[2-77]			4.50[6]	Kokomo = 4.60[30]			4.50[3]	4.60[3]	Duluth = 4.50[2] Pueblo = 4.75[14]	
PILING, Steel Sheet	4.20[1-9]	4.20[1]							4.20[3]					

STEEL PRICES

Smaller numbers indicate producing companies. See key at right.
Prices are in cents per lb unless otherwise noted. Extras apply.

Kansas City	Houston	Birmingham	WEST COAST Seattle, San Francisco, Los Angeles, Fontana		
			F=$76.00		INGOTS Carbon forging, net ton
	$59.00[83]		F=$77.00		Alloy, net ton
		$53.00[11]	F=$72.00[19]		BILLETS, BLOOMS, SLABS Carbon, rerolling, net ton
	$71.00[83]	$63.00[11]	F=$82.00[19]	Geneva=$63.00[16]	Carbon forging billets, net ton
	$74.00[83]		F=$85.00[19]		Alloy net ton
					PIPE SKELP
	4.25[83]	3.85[11]	SF=4.50[24] LA=4.65[24,62]	Portsmouth=3.85[20] Worcester=4.15[2]	WIRE RODS
		3.35[1,11]	SF, LA=4.05[24] F=4.25[19]	Ashland=3.35[7] Niles=3.50[64], Geneva=3.45[16]	SHEETS Hot-rolled (18 ga. & hvr.)
		4.10[11]	SF=5.05[24] F=5.00[19]		Cold-rolled
		4.40[1,11]	SF, LA=5.15[24]	Ashland=4.40[7] Kokomo=4.50[30]	Galvanized (10 gage)
					Enameling (12 gage)
					Long ternes (10 gage)
		5.05[11]	F=6.74[19]		Hi str. low alloy, h.r.
			F=7.05[19]		Hi str. low alloy, c.r.
					Hi str. low alloy, galv.
3.85[83]	3.68[83]	3.25[11]	SF, LA=4.00[24,62] F=4.40[19], S=4.25[62]	Ashland=3.25[7] Atlanta=3.40[65]	STRIP Hot-rolled
			F=5.75[19] LA=5.85[27]	New Haven=4.65[2], 5.00[68] Trenton=5.00[15]	Cold-rolled
		4.95[11]	F=6.64[19]		Hi str. low alloy, h.r.
			F=6.95[19]		Hi str. low alloy, c.r.
		7.60[11]	SF=8.25[24]		TINPLATE Coke, 1.50-lb base box 1.25 lb, deduct 20c
Deduct $1.15, 90c and 65c respectively from 1.50-lb coke base box price					Electrolytic 0.25, 0.50, 0.75 lb box
					BLACKPLATE, 29 gage Hollowware enameling
4.05[83]	3.85[83]	3.45[1,11]	SF, LA=4.15[24] LA=4.15[62]	Atlanta=3.60[65]	BARS Carbon steel
4.05[84]	3.85[83]	3.45[1,11]	SF, S=4.20[62] F=4.10[19]	Atlanta=3.60[65]	Reinforcing‡
				Putnam, Newark=4.55[69]	Cold-finished
4.55[83]	4.35[83]		LA=5.00[62] F=4.95[19]		Alloy, hot-rolled
				Newark,[69] Worcester[2]=5.20 Hartford=5.20[4]	Alloy-, cold-drawn
		5.20[11]	F=6.25[19]		Hi str. low alloy, h.r.
	3.90[83]	3.50[1,11]	F=4.10[19] S=4.40[62] Geneva=3.50[16]	Claymont=3.90[29] Coatesville=3.90[21] Harrisburg=4.25[35]	PLATE Carbon steel
				Harrisburg=5.25[35]	Floor plates
			F=5.40[19]	Coatesville=4.80[21]	Alloy
		5.35[11]	F=5.95[19]	Geneva=5.35[16]	Hi str. low alloy
4.00[83]	3.80[83]	3.40[11]	SF=3.95[62] LA=4.00[24,62]	Phoenixville=4.25[56] Geneva=3.40[16]	SHAPES, Structural
		5.15[11]	F=4.00[19] S=4.05[62]	Fontana=5.75[19] Geneva=5.15[16]	Hi str. low alloy
5.10[83]	4.90[83]	4.50[1,11]	SF, LA=5.45[24,62]	Portsmouth=4.50[20] Worcester=4.80[2]	MANUFACTURERS' WIRE Bright

Notes: †Special coated mfg ternes deduct $1.15 from 1.50-lb coke base box price. Can-making quality blackplate, 55 to 128-lb, deduct $1.90 from 1.50-lb coke base box. ‡Straight lengths only from producer to fabricator.

KEY TO STEEL PRODUCERS

With Principal Offices

1 Carnegie-Illinois Steel Corp., Pittsburgh
2 American Steel & Wire Co., Cleveland
3 Bethlehem Steel Co., Bethlehem
4 Republic Steel Corp., Cleveland
5 Jones & Laughlin Steel Corp., Pittsburgh
6 Youngstown Sheet & Tube Co., Youngstown
7 Armco Steel Corp., Middletown, Ohio
8 Inland Steel Co., Chicago
9 Weirton Steel Co., Weirton, W. Va.
10 National Tube Co., Pittsburgh
11 Tennessee Coal, Iron & R. R. Co., Birmingham
12 Great Lakes Steel Corp., Detroit
13 Sharon Steel Corp., Sharon, Pa.
14 Colorado Fuel & Iron Corp., Denver
15 Wheeling Steel Corp., Wheeling, W. Va.
16 Geneva Steel Co., Salt Lake City
17 Crucible Steel Co. of America, New York
18 Pittsburgh Steel Co., Pittsburgh
19 Kaiser Steel Corp., Oakland, Calif.
20 Portsmouth Div., Detroit Steel Corp., Detroit
21 Lukens Steel Co., Coatesville, Pa.
22 Granite City Steel Co., Granite City, Ill.
23 Wisconsin Steel Co., South Chicago, Ill.
24 Columbia Steel Co., San Francisco
25 Copperweld Steel Co., Glassport, Pa.
26 Alan Wood Steel Co., Conshohocken, Pa.
27 Calif. Cold Rolled Steel Corp., Los Angeles
28 Allegheny Ludlum Steel Corp., Pittsburgh
29 Worth Steel Co., Claymont, Del.
30 Continental Steel Corp., Kokomo, Ind.
31 Rotary Electric Steel Co., Detroit
32 Laclede Steel Co., St. Louis
33 Northwestern Steel & Wire Co., Sterling, Ill.
34 Keystone Steel & Wire Co., Peoria, Ill.
35 Central Iron & Steel Co., Harrisburg, Pa.
36 Carpenter Steel Co., Reading, Pa.
37 Eastern Stainless Steel Corp., Baltimore
38 Washington Steel Corp., Washington, Pa.
39 Jessop Steel Co., Washington, Pa.
40 Blair Strip Steel Co., New Castle, Pa.
41 Superior Steel Corp., Carnegie, Pa.
42 Timken Steel & Tube Div., Canton, Ohio
43 Babcock & Wilcox Tube Co., Beaver Falls, Pa.
44 Reeves Steel & Mfg. Co., Dover, Ohio
45 John A. Roebling's Sons Co., Trenton, N. J.
46 Simonds Saw & Steel Co., Fitchburg, Mass.
47 McLouth Steel Corp., Detroit
48 Cold Metal Products Co., Youngstown
49 Thomas Steel Co., Warren, Ohio
50 Wilson Steel & Wire Co., Chicago
51 Sweet's Steel Co., Williamsport, Pa.
52 Superior Drawn Steel Co., Monaca, Pa.
53 Tremont Nail Co., Wareham, Mass.
54 Firth Sterling Steel & Carbide Corp., McKeesport, Pa.
55 Ingersoll Steel Div., Chicago
56 Phoenix Iron & Steel Co., Phoenixville, Pa.
57 Fitzsimmons Steel Co., Youngstown
58 Stanley Works, New Britain, Conn.
59 Universal-Cyclops Steel Corp., Bridgeville, Pa.
60 American Cladmetals Co., Carnegie, Pa.
61 Cuyahoga Steel & Wire Co., Cleveland
62 Bethlehem Pacific Coast Steel Corp., San Francisco
63 Follansbee Steel Corp., Pittsburgh
64 Niles Rolling Mill Co., Niles, Ohio
65 Atlantic Steel Co., Atlanta
66 Acme Steel Co., Chicago
67 Joslyn Mfg. & Supply Co., Chicago
68 Detroit Steel Corp., Detroit
69 Wyckoff Steel Co., Pittsburgh
70 Bliss & Laughlin, Inc., Harvey, Ill.
71 Columbia Steel & Shafting Co., Pittsburgh
72 Cumberland Steel Co., Cumberland, Md.
73 La Salle Steel Co., Chicago
74 Monarch Steel Co., Inc., Hammond, Ind.
75 Empire Steel Co., Mansfield, Ohio
76 Mahoning Valley Steel Co., Niles, Ohio
77 Oliver Iron & Steel Co., Pittsburgh
78 Pittsburgh Screw & Bolt Co., Pittsburgh
79 Standard Forging Corp., Chicago
80 Driver Harris Co., Harrison, N. J.
81 Detroit Tube & Steel Div., Detroit
82 Reliance Div., Eaton Mfg. Co., Massillon, Ohio
83 Sheffield Steel Corp., Kansas City
84 Plymouth Steel Co., Detroit

STAINLESS STEELS

Base prices, in cents per pound, f.o.b. producing point

Product	301	302	303	304	316	321	347	410	416	430
Ingots, rerolling	13.75	14.50	16.00	15.50	23.75	19.25	21.00	12.25	14.25	12.50
Slabs, billets, rerolling	18.00	19.25	21.25	20.25	31.25	25.50	27.75	16.50	19.50	16.25
Forg. discs, die blocks, rings	32.00	32.00	34.50	33.50	50.50	38.00	42.50	26.00	26.50	26.50
Billets, forging	25.75	25.75	27.75	27.00	40.50	30.50	34.25	21.00	21.50	21.50
Bars, wire, structurals	30.00	30.00	32.50	31.50	47.50	35.50	40.00	24.50	25.00	25.00
Plates	32.00	32.00	34.00	34.00	50.50	39.50	44.00	26.00	26.50-27.00	26.50
Sheets	39.00	39.00	41.00	41.00	54.50	47.00	51.50	34.50	35.00	37.00
Strip, hot-rolled	25.50	27.00	31.25	29.00	47.25	35.75	40.00	22.50	29.25	23.00
Strip, cold-rolled	32.00	34.50	38.00	36.50	56.50	46.00	50.00	28.50	35.00	29.00

STAINLESS STEEL PRODUCING POINTS—*Sheets:* Midland, Pa., 17; Brackenridge, Pa., 28; Butler, Pa., 7; McKeesport, Pa., 1; Washington, Pa., 38,39; Baltimore, 37; Middletown, Ohio, 7; Massillon, Ohio, 4; Gary, 1; Bridgeville, Pa., 59; New Castle, Ind., 55; Ft. Wayne, Ind., 67; Lockport, N. Y., 46.

Strip: Midland, Pa., 17; Cleveland, 2; Carnegie, Pa., 41; McKeesport, Pa., 54; Reading, Pa., 36; Washington, Pa., 38; W. Leechburg, Pa., 28; Bridgeville, Pa., 59; Detroit, 47; Massillon, Canton, Ohio, 4; Middletown, Ohio, 7; Harrison, N. J., 80; Youngstown, 48; Lockport, N. Y., 46; New Britain, Conn., 58; Sharon, 13; Butler, Pa., 7.

Bars: Baltimore, 7; Duquesne, Pa., 1; Munhall, Pa., 1; Reading, Pa., 36; Titusville, Pa., 59; Washington, Pa., 39; McKeesport, Pa., 1, 54; Bridgeville, Pa., 59; Dunkirk, N. Y., 28; Massillon, Ohio, 4; Chicago, 1; Syracuse, N. Y., 17; Watervliet, N. Y., 28; Waukegan, Ill., 2; Lockport, N. Y., 46; Canton, Ohio, 42; Ft. Wayne, Ind., 67.

Wire: Waukegan, Ill., 2; Massillon, Ohio, 4; McKeesport, Pa., 54; Bridgeport, Conn., 44; Ft. Wayne, Ind., 67; Trenton, N. J., 45; Harrison, N. J., 80; Baltimore, 7; Dunkirk, 28.

Structurals: Baltimore, 7; Massillon, Ohio, 4; Chicago, 1, 67; Watervliet, N. Y., 28; Bridgeport, Conn., 44.

Plates: Brackenridge, Pa., 28; Butler, Pa., 7; Chicago, 1; Munhall, Pa., 1; Midland, Pa., 17; New Castle, Ind., 55; Lockport, N. Y., 46; Middletown, 7; Washington, Pa., 39; Cleveland, Massillon, 4.

Forged discs, die blocks, rings: Pittsburgh, 1, 17; Syracuse, 17; Ferndale, Mich., 28.

Forging billets: Midland, Pa., 17; Baltimore, 7; Washington, Pa., 39; McKeesport, 54; Massillon, Canton, Ohio, 4; Watervliet, 28; Pittsburgh, Chicago, 1.

ELECTRICAL SHEETS

22 gage, HR cut lengths, f.o.b. mill

	Cents per lb.
Armature	6.20
Electrical	6.70
Motor	*7.95
Dynamo	8.75
Transformer 72	9.30
Transformer 65	9.85
Transformer 58	10.55
Transformer 52	11.35

PRODUCING POINTS—Beech Bottom, W. Va., 15; Brackenridge, Pa., 28; Follansbee, W. Va., 63; Granite City, Ill., 23*; add 0.20¢; Indiana Harbor, Ind., 8; Mansfield, Ohio, 75; Niles, Ohio, 64, 76; Vandergrift, Pa., 1; Warren, Ohio, 4; Zanesville, Ohio, 7.

MERCHANT WIRE PRODUCTS

To dealers, f.o.b. mill	Base Column	Pittsburg, Calif.
Standard & coated nails*	106	125§
Woven wire fence†	116	139
Fence posts, carloads††	116	...
Single loop bale ties	113	137
Galvanized barbed wire**	126	146
Twisted barbless wire	126	146

* Pgh., Chi., Duluth; Worcester, 6 columns higher; Houston, 8 columns higher; Kansas City, 12 columns higher. † 15½ gage and heavier. ** On 80 rod spools, in carloads. †† Duluth, Joliet; Johnstown, 112.

	Base per 100 lb	Pittsburg, Calif.
Merch. wire annealed‡	$5.35	$6.30
Merch. wire, galv.‡	5.60	6.55
Cut nails, carloads‡‡	6.75	...

‡ Add 30¢ at Worcester; 20¢ at Chicago; 10¢ at Sparrows Pt.
‡‡ Less 20¢ to jobbers.
§ Torrance 126.

PRODUCING POINTS — *Standard, Coated or galvanized nails, woven wire fence, bale ties, and barbed wire:* Alabama City, Ala., 4; Atlanta, 65; Aliquippa, Pa., (except bale ties), 5; Bartonville, Ill. (except bale ties), 34; Chicago, 4; Donora, Pa., 2; Duluth, 2; Fairfield, Ala., 11; Johnstown, Pa. (except bale ties), 3; Joliet, Ill., 2; Kokomo, Ind., 30; Minnequa, Colo., 14; Monessen, Pa. (except bale ties), 18; Pittsburg, Calif., 24; Portsmouth, Ohio, 20; Rankin, Pa. (except bale ties), 2; Sparrows Point (except woven fence), 3; Sterling, Ill., 33; San Francisco (except nails and woven fence), 14; Torrance, Calif. (nails only). 24; Worcester (nails only), 2; Houston (except bale ties), 83; Kansas City, 83.

Fence Posts: Duluth, 2; Johnstown, Pa., 3; Joliet, Ill., 2; Minnequa, Colo., 14; Moline, Ill., 4; Williamsport, Pa., 51.

Cut nails: Wheeling, W. Va., 15; Conshohocken, Pa., 26; Warehame, Mass., 53.

RAILS, TRACK SUPPLIES

F.o.b. mill

Standard rails, 100 lb and heavier, No. 1 quality, per 100 lb	$3.40
Joint bars, per 100 lb	4.40
Light rails, per 100 lb	3.75

	Base Price cents per lb
Track spikes†	5.60
Axles	5.25
Screw spikes	8.60
Tie plates	4.20
Pittsburg, Torr., Calif.; Seattle	4.35
Track bolts, untreated	5.85
Track bolts, heat treated, to railroads	9.10

†Kansas City, 5.85¢.

PRODUCING POINTS—*Standard rails:* Bessemer, Pa., 1; Ensley, Ala., 11; Gary, 1; Indiana Harbor, Ind., 8; Lackawanna, N. Y., 3; Minnequa, Colo., 14; Steelton, 3.

Light rails: All the above except Indiana Harbor and Steelton, plus Fairfield, Ala., 11; Johnstown, 3; Minnequa, 14.

Joint bars: Bessemer, Pa., 1; Fairfield, Ala., 11; Indiana Harbor, Ind., 8; Joliet, Ill., 1; Lackawanna, N. Y., 3; Steelton, Pa., 3; Minnequa, Colo., 14.

Track spikes: Indiana Harbor, Ind., 6, 8; Lebanon, Pa., 3; Minnequa, Colo., 14; Pittsburgh, 5; Chicago, 4; Struthers, 6; Youngstown, 4.

Track bolts: Lebanon, Pa., 3; Minnequa, Colo., 14; Pittsburgh, 77, 78.

Axles: Indiana Harbor, Ind., 79; Johnstown, Pa., 3.

Tie plates: Fairfield, Ala., 11; Gary, 1; Indiana Harbor, Ind., 8; Lackawanna, N. Y., 3; Pittsburg, Calif., 24; Seattle, 62; Steelton, Pa., 3; Torrance, Calif., 24; Minneona, Colo., 14.

Numbers after producing points correspond to steel producers. See key on Steel Price page.

PIPE AND TUBING

Base discounts, f.o.b. mills
Base price about $200.00 per net ton

Standard, T & C

Steel, Buttweld*	Black	Galv
⅛-in.	40½ to 38½	21 to 19
¼-in.	43½ to 41½	25 to 23
⅜-in.	46 to 44	28 to 26
½-in.	46½ to 44½	28½ to 26½
¾-in.	47 to 45	29 to 27
1-in.	47½ to 45½	29½ to 27½
1¼ to 3-in.	48 to 46	30 to 28

Steel, lapweld		
2-in.	38	19½
2½ to 3-in.	42	23½
3½ to 6-in.	43 to 40	24½ to 21½

Steel, seamless		
2-in.	36	17½
2½ to 3-in.	39	20½
3½ to 6-in.	41	22½

Wrought iron, buttweld		
⅛-in.	+26½	+56
¼-in.	+16½	+45
⅜ & 1¼-in.	+10½	+36
1½-in.	+ 4½	+32½
2-in.	+ 4	+32

Wrought iron, lapweld		
2-in.	+13½	+40
2½ to 3½-in.	+11	+35½
4-in.	+ 6	+29½
4½ to 8-in.	+ 8	+31
9 to 12-in.	+18	+40½

Extra Strong, Plain Ends

Steel, buttweld		
⅛-in.	39½ to 37½	21½ to 19½
¼-in	43½ to 41½	25½ to 23½
⅜-in.	45½ to 43½	28½ to 26½
1¼-in.	46 to 44	29 to 27
1½-in.	46½ to 44½	29½ to 27½
2-in.	47 to 45	30 to 29
2½ to 3-in.	47½ to 45½	30½ to 28½

Steel, lapweld		
2-in.	37	19½
2½ to 3-in.	42	24½
3½ to 6-in.	44½ to 41½	27 to 24

Steel, seamless		
2-in.	35	17½
2½ to 3-in.	38	21½
3½ to 6-in.	42½	25

Wrought iron, buttweld		
⅛-in.	+22	+50
¼-in.	+15½	+43
⅜ to 2 in.	+ 5½	+32

Wrought iron, lapweld		
2-in.	+10½	+36½
2½ to 4-in.	+ 1	+25
4½ to 6-in.	+ 5	+29½
7 & 8-in.	list	+24½
9 to 12-in.	+11½	+32½

For threads only, buttweld, lapweld and seamless pipe, one point higher discount (lower price) applies. For plain ends, buttweld, lapweld and seamless pipe 3-in. and smaller, three points higher discount (lower price) applies, while for lapweld and seamless 3½-in. and larger four points higher discount (lower price) applies. On buttweld lapweld steel pipe, jobbers are granted a discount of 5 pct.
* Fontana, Calif., deduct 11 points from figures in left columns.

BOILER TUBES

Seamless steel and electric welded commercial boiler tubes and locomotive tubes, minimum wall. Prices per 100 ft at mill in carload lots, cut lengths 10 to 24 ft inclusive.

OD in in.	gage BWG	Seamless H.R.	Seamless C.R.	Electric Weld H.R.	Electric Weld C.D.
2	13	$20.61	$24.24	$19.99	23.51
2½	12	27.71	32.58	26.88	31.60
3	12	30.82	36.27	29.90	35.18
3½	11	38.52	45.38	37.36	43.99
4	10	47.32	56.25	46.39	54.56

WAREHOUSE PRICES

Base prices, f.o.b. warehouse, dollars per 100 lb. (Metropolitan area delivery, add 20¢ to base price except Birmingham, San Francisco, Cincinnati, New Orleans, St. Paul (*), add 15¢; Philadelphia, add 25¢, Chicago, add 30¢).

CITIES	SHEETS			STRIP		PLATES	SHAPES	BARS		ALLOY BARS			
	Hot-Rolled	Cold-Rolled (18 gage)	Galvanized (18 gage)	Hot-Rolled	Cold-Rolled		Standard Structural	Hot-Rolled	Cold-Finished	Hot-Rolled, A 4615 As-rolled	Hot-Rolled, A 4140 Ann.	Cold-Drawn, A 4615 As-rolled	Cold-Drawn, A 4140 Ann.
Baltimore	5.15	6.39[1]	6.55[2] 6.65	5.59–5.59[11]	....	5.40–6.04[11]	5.69	5.59	6.19	9.89	9.99	11.12	11.49
Birmingham*	5.15[10]	5.95	6.15[7]	5.10	....	5.40	5.25	5.10	6.68	....	....	....	....
Boston	5.75	6.55[20]	6.94[3] 7.14	5.70	6.90–6.95	6.08	5.75	5.80	6.19–6.69	9.70–9.97	8.50–10.00	11.15	11.40
Buffalo	5.15	5.95	6.94	5.41	7.27	5.65	5.35	5.15	5.75	9.80	9.90	11.05	11.35
Chicago*	5.15	6.20	6.95	5.10	6.30	5.40	5.25	5.10	5.65	9.25	9.55	10.70	11.00
Cincinnati*	5.42–5.97	5.99–6.24	6.39	5.35	....	5.79	5.64	5.35–5.54	5.96–6.25	9.60–9.81	9.90–10.11	11.05–11.26	11.35–11.56
Cleveland	5.15	5.95	7.00–7.10	5.24	6.35	5.52	5.37	5.12	5.75	9.36	9.66	10.81	11.11
Detroit	5.33	6.08–6.33	7.09	5.49	6.43–6.80	5.59–5.79	5.64–5.68	5.39	5.91	9.56	9.86	11.01	11.31
Houston	6.00	....	....	6.10	....	6.00	5.95	6.10	7.80	10.35–10.45	10.80–10.60	11.50	11.95–12.10
Indianapolis	....	....	....	....	7.38	....	....	....	6.15	....	....	....	....
Kansas City	5.75	6.55[20]	7.55	5.70	6.95	6.00	5.85	5.70	6.35	9.85	10.15	11.30	11.60
Los Angeles	5.90	7.45	8.00[3]	5.95	8.70[16]	6.00	5.90	5.90	7.55	10.75	10.75	12.45	12.75
Memphis	5.93	6.68	....	5.98	6.80–6.51	6.08	5.93	5.68	6.51	....	....	....	....
Milwaukee	5.29	6.09	6.94–6.99	5.24	6.32	5.54	5.39	5.24	5.89	9.39	9.89	10.84	11.14
New Orleans*	5.50[1]	6.75 6.85[1]	....	5.55[1]	6.80 6.90[1]	5.65	5.55[1]	5.55[1]	6.75 6.80	....	....	....	....
New York	5.52	6.64	7.54[3]	5.84	6.78	5.88	5.65	5.67	6.44	9.80	9.90	11.05	11.35
Norfolk	6.10[13]	7.00	....	6.30[13]	....	6.15[13]	6.20[13]	6.15[13]	7.20[13]	....	....	....	....
Philadelphia*	6.05	6.20–6.35	6.85[3] 7.25	5.65	6.29	5.65	5.45	5.60	6.21	9.35	9.85	10.80	11.10
Pittsburgh	5.15	5.95	6.60	5.20	5.95–6.00	5.35	5.25	5.10	5.75	9.25	9.55	10.70	11.00
Portland	6.80–7.10[1]	8.40[3]	....	6.85[9]	....	6.40[9]	6.50	6.45–6.45[9]	8.60[14]	12.00[18]	11.80[18]	....	....
Salt Lake City	5.65	6.70	....	7.45	8.75	6.10[3]	5.90	7.35[3]	8.75	....	....	....	....
San Francisco*	6.20	7.60[3]	7.65[3]	6.15	7.85[16]	6.10	6.00	6.00	7.55	10.75	10.75	12.45	12.75
Seattle	6.60[4]	8.15[3]	8.40[3]	6.85[4]	....	6.35[4]	6.20[4]	6.35[4]	8.50[14]	....	11.80[18]	....	13.60[18]
St. Louis	5.48	6.28	7.18	5.43	7.30	5.73	5.58	5.43	6.08	9.58	9.88	11.03	11.33
St. Paul*	5.71	6.51	7.41	5.66	6.16–6.82	5.96	5.81	5.66	6.31	9.81	10.11	11.26	11.56

BASE QUANTITIES: (*Standard unless otherwise keyed on prices.*)
Hot-rolled sheets and strip, hot rolled bars and bar shapes, structural shapes, plate, galvanized sheets and cold-rolled sheets: 2000 to 9999 lb. Cold-finished bars: 2000 lb or over. Alloy bars: 1000 to 1999 lb.

All HR products may be combined to determine quantity bracket. All galvanized sheets may be combined to determine quantity bracket. CR sheets may not be combined with each other or with galv. sheets to determine quantity bracket.

Exceptions:
(1) 400 to 1499 lb; (2) 450 to 1499 lb; (3) 300 to 4999 lb; (4) 300 to 9999 lb; (5) 2000 to 5999 lb; (6) 1000 lb and over; (7) 500 to 1499 lb; (8) 400 lb and over; (9) 400 to 9999 lb; (10) 500 to 9999 lb; (11) 400 to 3999 lb; (12) 450 to 3749 lb; (13) 400 to 1999 lb; (14) 1500 lb and over; (15) 1000 to 9999 lb; (16) 6000 lb and over; (17) up to 1999 lb; (18) 1000 to 4999 lb; (19) 1500 to 3499 lb; (20) CR sheets may be combined for quantity; (21) 2 to 24 bundles.

PIG IRON PRICES

Dollars per gross ton. Delivered prices do not include 3 pct tax on freight.

PRODUCING POINT PRICES

Producing Point	Basic	No. 2 Foundry	Malleable	Bessemer	Low Phos.
Bethlehem	48.00	48.50	49.00	49.50	.....
Birmingham	43 05	43.55	....	.....	.....
Buffalo	49 00	49.50	50.00	.....	.....
Chicago	49.00	49.50	49.50	50.00	.....
Cleveland	49.00	49.50	49.50	50.00	54.00
Daingerfield, Tex.	45.00	45.50	45.50	.....	.....
Duluth	49.00	49.50	49.50	50.00	.....
Erie	49.00	49.50	49.50	50.00	.....
Everett		52 25	52.75	.....	.....
Fontana	52.00	52.50	.....	.....	.....
Granite City	47.90	48.40	48.90	.....	.....
Ironton, Utah	46.00	46.50	.....	.....	.....
Pittsburgh	46.00*			47.00	.....
Neville Island	49.00	49.50	49.50	50.00	.....
Geneva, Utah	46.00	46.50	.....	.....	.....
Sharpsville	49.00	49.50	49.50	50.00	.....
Steelton	48.00	48.50	49.00	49.50	54.00
Swedeland	50.00	50.50	51.00	51.50	.....
Toledo	49.00	49.50	49.50	50.00	.....
Troy, N. Y.	51.00	51.50	52.00	....	54.00
Youngstown	49.00	49.50	49.50	50.00	.....

DELIVERED PRICES (BASE GRADES)

Consuming Point	Producing Point	Rail Freight Rate	Basic	No. 2 Foundry	Malleable	Bessemer	Low Phos.
Boston	Everett	$.60-.80	.....	52.85–53.05	53.55–53.75	.....	.....
Boston	Steelton	6.90	.....	.....	.....	.....	60.90
Brooklyn	Bethlehem	4.29	.....	52.79	53.29	53.79	.....
Cincinnati	Birmingham	6.70	49.75	50.25	.....	.....	.....
Jersey City	Bethlehem	2.63	.....	51 13	51.63	52.13	.....
Los Angeles	Geneva-Ironton-Fontana	7.70	53.70	54.20	.....	.....	.....
Mansfield	Cleveland-Toledo	3.33	49.33	49.83	49.83	50.33	54.33
Philadelphia	Bethlehem	2.39	50.39	50.89	51.39	51.89	.....
Philadelphia	Swedeland	1.44	51.44	51.94	52.44	52 94	.....
Philadelphia	Steelton	3.09	51.09	51.59	52.09	52.59	57.09
Rochester	Buffalo	2.63	51.63	52.13	52.63	.....	.....
San Francisco	Geneva-Ironton-Fontana	7.70	53.70	54.20	.....	.....	.....
Seattle	Geneva-Ironton-Fontana	7.70	53.70	54.20	.....	.....	.....
St. Louis	Granite City	0.75 Arb.	48.65	49.15	49.65	.....	.....
Syracuse	Buffalo	3.58	52.58	53.08	53.58	.....	.....

* *Monessen, $51.00.*

Producing point prices are subject to switching charges; silicon differential (not to exceed 50c per ton for each 0.25 pct silicon content in excess of base grade which is 1.75 to 2.25 pct for foundry iron); phosphorus differentials, a reduction of 38c per ton for phosphorus content of 0.70 pct and over; manganese differentials, a charge not to exceed 50c per ton for each 0.50 pct manganese content in excess of 1.00 pct. $2 per ton extra may be charged for 0.5 to 0.75 pct nickel content and $1 per ton extra for each additional 0.25 pct nickel.

Silvery iron (blast furnace) silicon 6.01 to 6.50 pct C/L per g.t., f.o.b. Jackson, Ohio—$57.00; f.o.b. Buffalo, $58.25. Add $1.00** per ton for each additional 0.50 pct Si up to 17 pct. Add 50c per ton for each 0.50 pct Mn over 1.00 pct. Add $1.00 per ton for 0.75 pct or more P. Bessemer ferrosilicon prices are $1.00 per ton above silvery iron prices of comparable analysis. ***Buffalo, add $1.50.*

Charcoal pig iron base price for low phosphorus $64.00 per gross ton, f.o.b. Lyle, Tenn. Delivered Chicago, $72.56. High phosphorus charcoal pig iron is not being produced.

BOLTS, NUTS, RIVETS, SET SCREWS

Consumer Prices

(Bolts and nuts, f.o.b. mill Pittsburgh, Cleveland, Birmingham or Chicago)
Base discount

Machine and Carriage Bolts

	Pct Off List Less Case	C.
½ in. & smaller x 6 in. & shorter	27	38
9/16 & ⅝ in. x 6 in. & shorter	29	40
¾ in. & larger x 6 in. & shorter	26	37
All diam, longer than 6 in.	22	34
Lag, all diam, longer than 6 in.	28	39
Lag, all diam x 6 in. & shorter	30	41
Plow bolts	40	—

Nuts, Cold Punched or Hot Pressed

(Hexagons or Square)

½ in. and smaller	25	37
9/16 to ⅝ in.	23	35
¾ to 1½ in. inclusive	23	35
1⅝ in. and larger	16	29

Semifinished Hexagon Nuts

(Less case lots)

	Pct Off List Reg	Hvy	Lt
½ in. and smaller	41	35	41
9/16 to ⅝ in.	36	30	36
¾ to 1½ in.	31	27	33
1⅝ in. and larger	21	17	..

In full case lots, 15 pct additional discount.

Stove Bolts

	Pct Off List
Packaged, steel, plain finish	63
Packaged, plated finish	50
Bulk, plain finish**	69*

* Discounts apply to bulk shipments in not less than 15,000 pieces of a size and kind where length is 3-in. and shorter; 5000 pieces for lengths longer than 3-in. For lesser quantities, packaged price applies.

** Zinc, Parkerized, cadmium or nickel plated finishes add 6¢ per lb net. For black oil finish, add 2¢ per lb net.

Large Rivets

(½ in. and larger)
Base per 100 lb

F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham, Lebanon, Pa.	$7.25

Small Rivets

(7/16 in. and smaller)

	Pct Off List
F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham	43

Cap and Set Screws

(In bulk)	Pct Off List
Hexagon head cap screws, coarse or fine thread, ¼ in. thru ⅝ in. x 6 in., SAE 1020, bright	60
¼ in. through ⅝ in. x 6 in. and shorter high C heat treated	54
Milled studs	23
Flat head cap screws, listed sizes	24
Fillister head cap, listed sizes	43
Set screws, sq head, cup point, 1 in. diam and smaller x 6 in. and shorter	59

C-R SPRING STEEL

Base per pound f.o.b. mill

0.26 to 0.40 carbon	4.50¢
0.41 to 0.60 carbon	5.95¢
0.61 to 0.80 carbon	6.55¢
0.81 to 1.05 carbon	8.50¢
1.06 to 1.35 carbon	10.80¢

Worcester, add 0.30c.

LAKE SUPERIOR ORES

(51.50% Fe; natural content, delivered lower lake ports)

	Per gross ton
Old range, bessemer	$8.10
Old range, nonbessemer	7.95
Mesabi, bessemer	7.85
Mesabi, nonbessemer	7.70
High phosphorus	7.70

After Jan. 25, 1950, increases or decreases in Upper Lake rail freight, dock handling charges and taxes are for buyers' account.

ELECTRODES

Cents per lb, f.o.b. plant, threaded electrodes with nipples, unbored

Diam. in in.	Length in in.	Cents Per lb
	GRAPHITE	
17, 18, 20	60, 72	17.00¢
8 to 16	48, 60, 72	17.00¢
7	48, 60	18.64¢
6	48, 60	19.95¢
4, 5	40	20.43¢
3	40	21.53¢
2½	24, 30	23.05¢
2	24, 30	24.15¢
	CARBON	
40	100, 110	7.65¢
35	65, 110	7.65¢
30	65, 84, 110	7.65¢
24	72 to 104	7.65¢
20	84, 90	7.65¢
17	60, 72	7.65¢
14	60, 72	8.16¢
10, 12	60	8.42¢
8	60	8.67¢

CLAD STEEL

Base prices, cents per pound, f.o.b. mill

Stainless-carbon	Plate	Sheet
No. 304, 20 pct, Coatesville, Pa. (21)	*28.00	
Washgtn, Pa. (39)	*28.00	
Claymont, Del. (29)	*26.50	
Conshohocken, Pa. (26)		*24.00
New Castle, Ind. (55)	*26.50	*25.50
Nickel-carbon 10 pct, Coatesville (21)	31.00	
Inconel-carbon 10 pct, Coatesville (21)	39.00	
Monel-carbon 10 pct, Coatesville (21)	32.00	
No. 302 Stainless-copper-stainless, Carnegie, Pa. (60)		75.00
Aluminized steel sheets, hot dip, Butler, Pa. (7)		7.75

* Includes annealing and pickling, or sandblasting.

TOOL STEEL

F.o.b. mill

W	Cr	V	Mo	Co	Base per lb
18	4	1	—	—	$1.00
18	4	1	—	5	$1.565
18	4	2	—	—	$1.13
1.5	4	1.5	8	—	71.5¢
6	4	2	6	—	76.5¢

High-carbon-chromium	57.5¢
Oil hardened manganese	32¢
Special carbon	29.5¢
Extra carbon	24.5¢
Regular carbon	21¢

Warehouse prices on and east of Mississippi are 3¢ per lb higher. West of Mississippi, 5¢ higher.

COKE

	Net Ton
Furnace, beehive (f.o.b. oven) Connellsville, Pa.	$14.00 to $14.50
Foundry, beehive (f.o.b. oven) Connellsville, Pa.	$16.00 to $16.50
Foundry, oven coke	
Buffalo, del'd	$24.00
Chicago, f.o.b.	21.00
Detroit, f.o.b.	21.65
New England, del'd	23.40
Seaboard, N. J., f.o.b.	22.00
Philadelphia, f.o.b.	21.25
Swedeland, Pa., f.o.b.	21.20
Painesville, Ohio, f.o.b.	21.90
Erie, del'd	$21.04 to 21.25
Cleveland, del'd	22.62
Cincinnati, del'd	22.71
St. Paul, f.o.b.	21.00
St. Louis, del'd	22.18
Birmingham, del'd	20.20

FLUORSPAR

Washed gravel fluorspar, f.o.b. cars, Rosiclare, Ill. Base price, per ton net; Effective CaF, content:

70% or more	$39.00
60% or less	36.00

REFRACTORIES

(F.o.b. works)

Fire Clay Brick *Carloads, Per 1000*

First quality, Ill., Ky., Md., Mo., Ohio, Pa. (except Salina, Pa., add $5)	$86.00
No. 1 Ohio	80.00
Sec. quality, Pa., Md., Ky., Mo., Ill.	80.00
No. 2 Ohio	72.00
Ground fire clay, net ton, bulk (except Salina, Pa., add $1.50)	14.00

Silica Brick

Mt. Union, Pa., Ensley, Ala.	$86.00
Childs, Pa.	90.00
Hays, Pa.	91.00
Chicago District	95.00
Western Utah and Calif.	101.00
Super Duty, Hays, Pa., Athens, Tex., Chicago	106.00
Silica cement, net ton, bulk, Eastern (except Hays, Pa.)	15.00
Silica cement, net ton, bulk, Hays, Pa.	17.00
Silica cement, net ton, bulk, Ensley, Ala.	16.00
Silica cement, net ton, bulk, Chicago District	16.00
Silica cement, net ton, bulk, Utah and Calif.	22.50

Chrome Brick *Per Net Ton*

Standard chemically bonded, Balt., Chester	$72.00

Magnesite Brick

Standard, Baltimore	$94.00
Chemically bonded, Baltimore	83.00

Grain Magnesite *St. ¾-in. grains*

Domestic, f.o.b. Baltimore, in bulk fines removed	$56.00 to $57.00
Domestic, f.o.b. Chewelah, Wash., in bulk	33.00
in sacks	38.00

Dead Burned Dolomite

F.o.b. producing points in Pennsylvania, West Virginia and Ohio, per net ton, bulk Midwest, add 10¢; Missouri Valley, add 20¢ | $13.00

METAL POWDERS

Per pound, f.o.b. shipping point, in ton lots, for minus 100 mesh.

Swedish sponge iron c.l.f. New York, ocean bags	7.4¢ to 9.0¢
Canadian sponge iron, del'd, in East	10.00¢
Domestic sponge iron, 98+% Fe, carload lots	9.0¢ to 15.0¢
Electrolytic iron, annealed, 99.5+% Fe	36.0¢ to 39.5¢
Electrolytic iron unannealed, minus 325 mesh, 99+% Fe	48.5¢
Hydrogen reduced iron, minus 300 mesh, 98+% Fe	63.0¢ to 80.0¢
Carbonyl iron, size 5 to 10 micron, 98%, 99.8+% Fe	70.0¢ to $1.35
Aluminum	29.00¢
Brass, 10 ton lots	27.75¢ to 31.25¢
Copper, electrolytic	9.25¢ plus metal value
Copper, reduced	9.75¢ plus metal value
Cadmium, 100-199 lb	$2.95
Chromium, electrolytic, 99% min., and quantity	$3.50
Lead	6.5¢ plus metal value
Manganese	52.00¢
Molybdenum, 99%	$2.65
Nickel, unannealed	75.5¢
Nickel, annealed	81.5¢
Nickel, spherical, unannealed	78.5¢
Silicon	34.00¢
Solder powder	6.5¢ to 8.5¢ plus met. value
Stainless steel, 302	75.00¢
Tin	11.00¢ plus metal value
Tungsten, 99%	$2.90
Zinc, 10 ton lots	20.50¢ to 23.85¢

CAST IRON WATER PIPE

Per net ton

6 to 24-in., del'd Chicago	$91.80 to $95.30
6 to 24-in., del'd N. Y.	91.00 to 92.00
6 to 24-in., Birmingham	78.00 to 82.50
6-in. and larger, f.o.b. cars, San Francisco, Los Angeles, for all rail shipment; rail and water shipment less	$108.50 to $113.00

Class "A" and gas pipe, $5 extra; 4-in pipe is $5 a ton above 6-in.

PERFORATED METALS

FOR
ALL INDUSTRIAL USES

PERFORATIONS IN
HEAVY PLATES
ARCHITECTURAL GRILLES

DIAMOND MFG. CO.

BOX 28 WYOMING, PA.

WRITE FOR CATALOG 35

Have It Galvanized by—

JOSEPH P. CATTIE & BROS., INC.

Gaul & Letterly Sts., Philadelphia 25, Pa.

Philadelphia's Oldest, The Country's Largest

Hot Dip Job Galvanizer • Galvanized Products Furnished

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PRODUCERS OF

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Small Merchant BARS - Bar Size SHAPES

BOIARDI STEEL CORPORATION

300 Lower Market St. Milton, Pennsylvania

Specialists in Blast Furnace and All Types of Firebrick Construction Work

A. E. ANDERSON CONSTRUCTION CORPORATION

1720 MILITARY ROAD

P. O. BOX STATION B, BOX 36, BUFFALO, N. Y.

THE KING PORTABLE BRINELL

A hardness tester particularly adapted for use on CASTINGS and FORGINGS

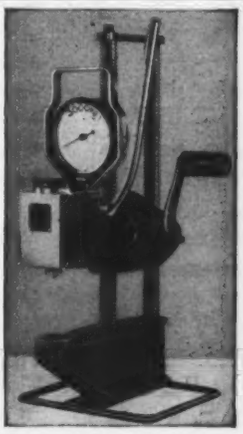
Puts an actual load of 3000kg on a 10mm ball.

Throat, 4" deep.
Gap, 10" high.
Weight, 26 lbs.

Can be used in any position—even upside down.

Equally accurate as portable or stationary equipment.

Test head removable for testing larger pieces beyond the capacity of the standard base.



ANDREW KING

524 Broad Acres Rd., Narberth, Penna.

CUT ALL METALS *in Seconds*

WITH **STONE "SWING-CUT"**

CUTS WET OR DRY

Typical Cutting Times

3" angle iron — 8 seconds
2" rd cold rolled — 14 seconds
1" tool steel — 5 seconds
2" steel tubing — 5 seconds

Metals in any size or shape up to 3" solids and 4" pipe cut with milled-like finish to tolerances of .008. Fast-acting, self-centering vise for angle cutting to 46°, air activated either hand or foot controlled. Vee-Block jaws for cutting rounds and tubing can be supplied.

You'll want to know more about the many features of the "Swing-Cut" and how it can lower your costs. Write today and we will send you *complete* information by return mail.

STONE MACHINERY CO., INC.

404 Fayette St. Manlius, N. Y.

THE CLEVELAND STEEL TOOL CO.

Punches, Dies, Chisels, Rivet Sets

660 E. 82d St., Cleveland, O.

If it's RIVETED you KNOW it's safe

Famous for

- ACCURACY OF THREADS
- LOW CHASER COST
- ALL AROUND DEPENDABILITY

Bulletins available: General Purpose Die Heads, Insert Chaser Die Head, Threading Machines.

See our Adv. on page 106 Aug. 24 Iron Age

THE EASTERN MACHINE SCREW CORP., 21-41 Barclay St., New Haven, Conn.
Pacific Coast Representative: *A. C. Berkringer, 334 N. San Pedro Street, Los Angeles California.* *P. P. Barber Machinery Co., Toronto, Canada.*

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DROP-FORGINGS

ANY SHAPE · ANY MATERIAL · COMPLETE FACILITIES

Write for Free Forging Data Folder . . . Helpful, Informative.

J. H. WILLIAMS & CO., "The Drop-Forging People" BUFFALO 7, N. Y.

CONSIDER GOOD USED EQUIPMENT FIRST

AIR COMPRESSOR

3000 cu. ft. Ingersoll Rand PRE-2 Air Compressor 30" & 18" x 21", Motor Driven with direct connected 500 H.P. G.E. Syn. Motor 110 lb. Pressure

BENDING ROLL

14' Niles Pyramid Type Plate Bending Roll. Top Roll 18½", Bottom Rolls 14" Diameter. 25 H.P. Westinghouse 440/3/60 Main Drive Motor. 7½ H.P. Westinghouse Elevating Motor

CRANE—OVERHEAD ELECTRIC TRAVELING

100 ton P&H Overhead Electric Traveling Crane. 50 Ft. Span. Two 50 Ton Trolleys. One 5 Ton Auxiliary Hoist. Six Motors 220 volts, 3 phase, 60 cycle

FURNACE—MELTING

500 Lb. Moore Rapid Lectromelt Electric Furnace. Size "T," Type 4. Complete with Transformer Equipment.

FORGING MACHINE

4" AJAX Improved Model Forging Machine. Suspended Die Slides. Balanced Twin Drive. Rocker Type Drop Lock

HAMMER—STEAM DROP

35,000 lb. Chambersburg Steam Drop Hammer. Bore of Cylinder 40" Diameter. Distance Between Vees 54". Built 1941 —Excellent Condition

MILLING MACHINE—PLANER TYPE

Ingersoll Planer Type Slab Milling Machine, Adjustable Rail, Motor Driven

SWAGER

Model 306 Etna 2-Die Swaging Machine. Timken Roller Bearings. Complete with Hydraulic Feeding Unit. 25 H.P. 220/440 Volt A.C. Motor. Capacity 3" Diameter, 6" Die Length

RITTERBUSH & COMPANY INC.
50 Church Street
New York 8, N. Y.
Phone—Cort 7-3437

The Clearing House

NEWS OF USED, REBUILT AND SURPLUS MACHINERY

Cleveland Prices Up—Demand for good used machine tools here is far in excess of supply. For this reason, dealers' buying prices have jumped 30 to 50 pct in the past six weeks. A No. 3 Warner & Swasey turret lathe, which could have been bought for $2,000 a few months ago, is bringing about $3,500 today.

Some dealers feel that the present shortage of machines and the improved prospects for getting contract work to run on machines are causing owners to ask too much for their machines. The quick capital gain incentive is gone.

Used Dealers Benefit—A factor in the present demand for used machines is the long delivery time on most new models. Extended deliveries have parked a lot of customers on dealers' doorsteps. It is believed that a large part of these customers would buy new machines if they could get them.

Cleveland Demand—Active demand exists today for centerless grinders, automatic screw machines, and other production machines. However, presses are the real pearl of great price. One dealer reported that he could sell 10 times as many presses as he can conceivably pick up. "We used to have 10 to 15 in stock all the time. Today, we don't have one, and are getting four or five telephone calls for them every day."

MDNA Advises—"Buy Now"—J. M. P. Fox, executive director of the Machinery Dealers National Assn., is urging all members of this organization to "buy now." He tells that all evidences from Washington and Wall Street point to higher wages and prices in the near future. Also, price controls will not be instituted before the middle of November at the earliest. Although there is now a momentary lull, Mr. Fox advises that dealers must be prepared for a buying spree after the November elections.

He points out that total defense authorizations for this year amount to $40 billion, for next year, $40 billion, and after that at the rate of $50 billion. Tax income will be $5 billion for 1950, $7 billion for 1951, and $12 billion for 1952. Because these taxes will fall far short of paying the cost of defense, Mr. Fox warns that deficit financing and inflation of spending power will cause prices to rise for many years.

Back In Business—The Chicago firm of Gilmore Machinery Co. will be back in business at 24 S. Clinton Street in the near future. Gill and Mory Kotler, partners, had closed the business in May to open a hotel in Florida. Now that the hotel has been established, they are returning to the used machinery business in Chicago.

West Coast Complaint — Machine and heavy equipment distributors in Seattle are complaining that the Federal government is giving them tough competition in Alaska. At the end of the war the government had a considerable quantity of surplus heavy equipment in that area. Since that time it has permitted government contractors to draw upon this supply for use at a nominal cost. Cost to contractors is reported to be about one-tenth of the cost of operating newly purchased machines. Although this means lower priced jobs and a saving for taxpayers, it is allegedly preventing the sale of much new equipment.

Auctions Are Fewer — There have been fewer auctions in the Chicago area during the last three months. Rumor has it that owners of "shaky" manufacturing plants are holding off liquidations in hope that they will get better prices in a few months.

No. 102 of a Series of Typical Installations

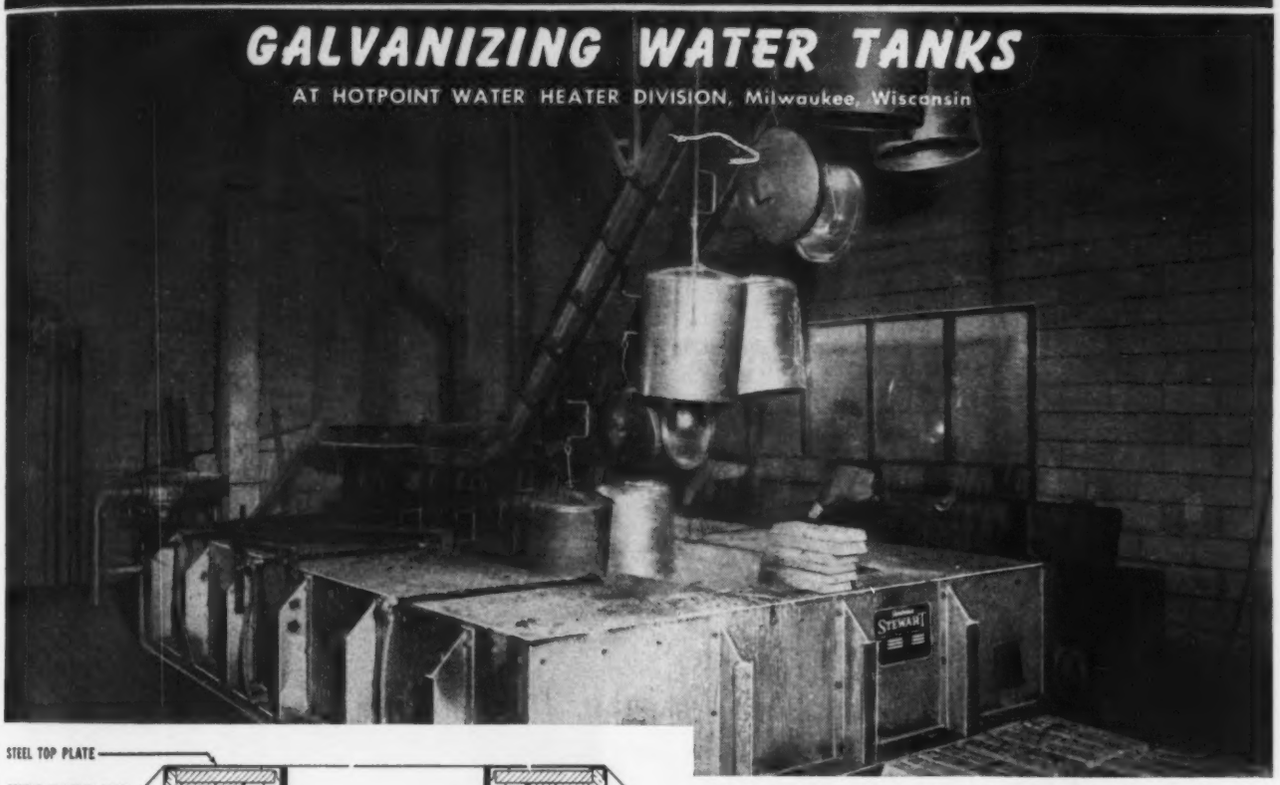
Sunbeam STEWART

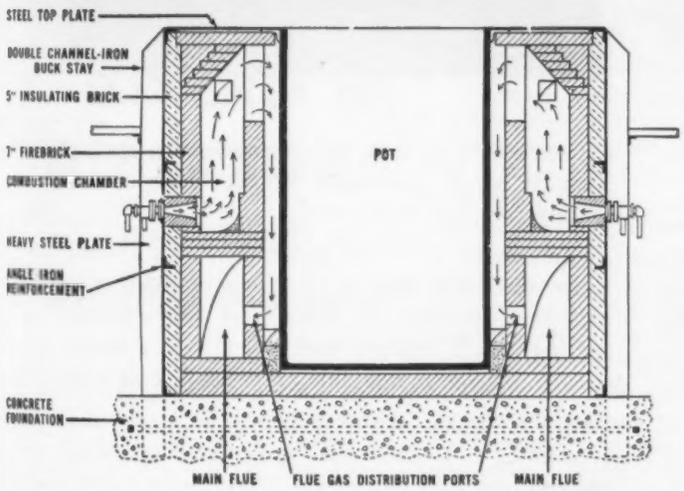
THE BEST INDUSTRIAL FURNACES MADE

HOW SUNBEAM STEWART FURNACES HELP MANUFACTURERS REDUCE COSTS AND KEEP THEMSELVES COMPETITIVE

GALVANIZING WATER TANKS

AT HOTPOINT WATER HEATER DIVISION, Milwaukee, Wisconsin





Plan view of the Sunbeam Stewart galvanizing furnace in use at Hotpoint. Note how the fuel is completely burned in a separate combustion chamber and how the hot products of combustion flow evenly up over a dividing baffle wall to the top section of the pot and then down the side to exhaust vents. This design assures:

UNIFORM BATH TEMPERATURE; MAXIMUM PRODUCTION RATE; LOW DROSS LOSS; LOW FUEL CONSUMPTION AND LONG KETTLE LIFE.

At Hotpoint, water tanks with diameters from 16 to 20 inches and depths from 16 to 60 inches are galvanized in Sunbeam Stewart deep-type Galvanizing equipment. The 8½ ft. depth of the settings presented problems in heat distribution not normally encountered with conventional settings.

The Sunbeam Stewart indirect, high side fired furnace design, together with 20 special nozzle-mixing burners, makes it possible to supply an even quantity of heat to the sides of the kettle. The accurate flame control of the burner gives the desired flame length while still maintaining a sufficient BTU output. The turndown ratio eliminates the need for a second set of burners for idling temperatures.

Improved design and correct engineering have made Sunbeam Stewart the leader for galvanizing equipment. Quality of work and low cost of maintenance and operation are key factors in Sunbeam Stewart's design that have proved their worthiness year after year. Users report dross loss as low as 5% and kettle life up to six years. If galvanizing is important in your manufacturing process, it will pay to consult Sunbeam Stewart. Designs are available for small or large production. We will be glad to submit ideas on how you can get more economical operation.

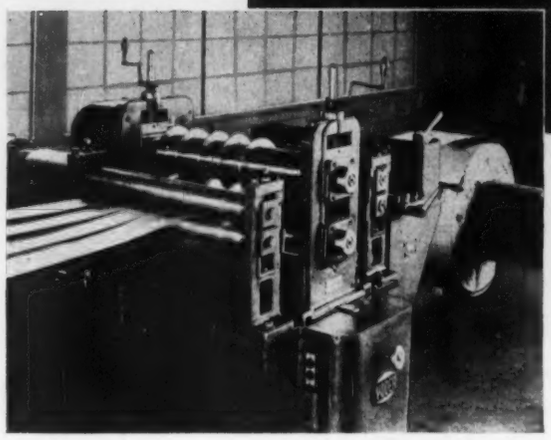
Sunbeam STEWART INDUSTRIAL FURNACE DIVISION of Sunbeam CORPORATION

(Formerly **CHICAGO FLEXIBLE SHAFT CO.***)*

Main Office: Dept. 110, 4433 Ogden Ave., Chicago 23 — New York Office: 322 W. 48th St., New York 19 — Detroit Office: 3049 E. Grand Blvd., Detroit
Canada Factory: 321 Weston Rd., So., Toronto 9

A letter, wire or 'phone call will promptly bring you information and details on SUNBEAM STEWART furnaces, either units for which plans are now ready or units especially designed to meet your needs. Or, if you prefer, a SUNBEAM STEWART engineer will be glad to call and discuss your heat treating problems with you.

If you use or sell over 1000 tons of Coiled Strip per year—



doing your own slitting will be a big convenience, and very likely also a big economy.

Investigate! First determine how much of your present strip cost represents slitting cost, and how much a Yoder slitting line would cost. You may find it will pay for itself in a year or two—possibly in much less time.

Consider other advantages: Reduction in inventories of coils and slit strands by as much as 60 to 70%; ability within a few hours to produce slit strands of any desired widths, from a relatively small stock of convenient coil sizes; production planning made simpler, easier; no long waits for deliveries; greater accuracy; no damaged edges; reduced freight and hauling cost; less bookkeeping.

At the rate of 20 to 40 tons per day, even a small Yoder slitter will produce 1000 tons of slit strands in 25 to 50 working days. Where very narrow widths and very small coils are used, even with a much smaller tonnage the savings will be just as big.

Send for 76-page illustrated book, discussing the economics and other phases of slitter operation and equipment.

THE YODER COMPANY • 5510 Walworth Avenue, Cleveland 2, Ohio

Complete Production Lines

- ★ COLD-ROLL-FORMING and auxiliary machinery
- ★ GANG SLITTING LINES for Coils and Sheets
- ★ PIPE and TUBE MILLS—cold forming and welding

ENGINEERING YODER MANUFACTURING

BOARD of DIRECTORS *meeting on a machine screw*

Sounds like an exaggeration, doesn't it? But it's not so far-fetched when you consider that this machine screw symbolizes a whole group of fastenings that have been failing in service because of corrosion.

More or less, this happens every day in American industry. A small bolt or screw or rivet, that was never designed for use under corrosive conditions, gives way—and the whole machine, or process, grinds to a stop.

The only way to keep out of this picture is to make sure that the fastenings you use are non-ferrous or stainless steel.

Harper specializes in these Everlasting Fastenings; makes them in over 7000 different sizes, types and alloys—Brass, Bronzes, Copper, Monel and Stainless Steels; maintains large quantities in stock, ready for immediate delivery from distributors and warehouses located in principal cities.

If rust and corrosion resistance is important to you . . . if you can see the real economy in replacing common steel with fastenings that are non-magnetic, longer-lasting, reusable . . . write today for our catalog and current stock list: The H. M. Harper Company, 8215 Lehigh Avenue, Morton Grove, Ill.

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AMERICA'S LEADING SPECIALISTS

EVERLASTING FASTENINGS

IN NON-FERROUS AND STAINLESS STEEL FASTENINGS

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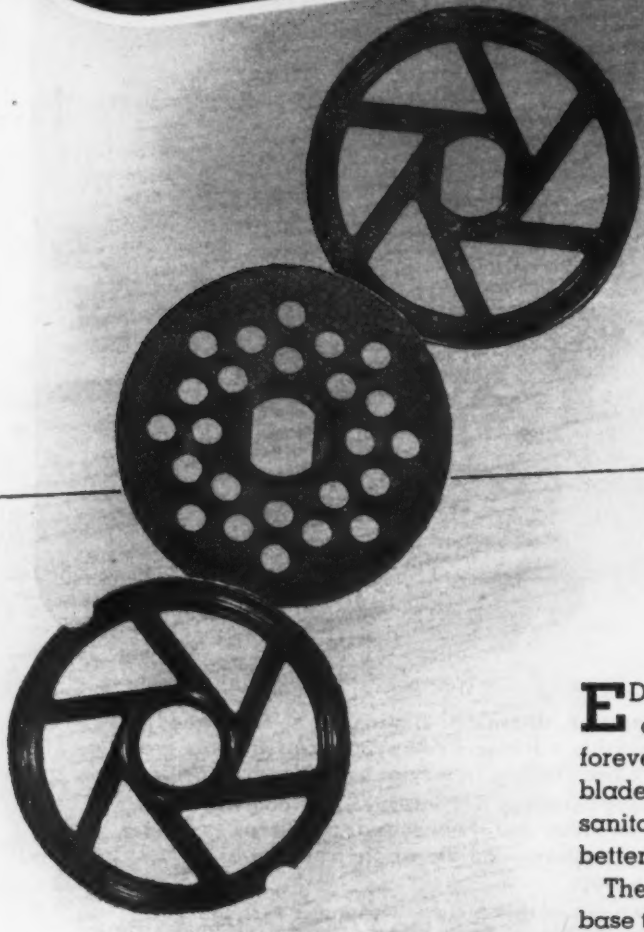
STAINLESS STEEL KNIVES HELP MAKE Grind-O-Mat "Grindingest" Grinder in the World



EDGE-HOLDING KNIVES of Sharon STAINLESS steel assure Grind-O-Mat owners fine cutting performance forever. Juices of the strongest variety will not harm the blades. The dense STAINLESS surface cleans easily, stays sanitary. STAINLESS steel has enabled Rival to build a better-performing, longer-lasting, better-selling product.

The beautiful new Rival Grind-O-Mat has everything — base that firmly grips any smooth surface without clamps — large, round food hopper that fits the hand and slopes for food drainage, detachable for quick rinsing — smooth attractive exterior, easy to keep sparkling clean — and cutting knives of edge-holding, non-rusting STAINLESS STEEL. No wonder folks who have used the new Grind-O-Mat say — "It's the 'grindingest' grinder ever!"

Sharon STAINLESS makes any product a better product. Think about STAINLESS for your particular use — and when you do — think of Sharon — pioneer and prime producer of fine steels for fifty years. Fabrication information, engineering data upon request.

SHARON STEEL CORPORATION

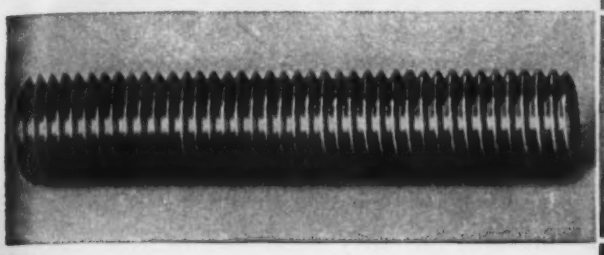
Sharon, Pennsylvania

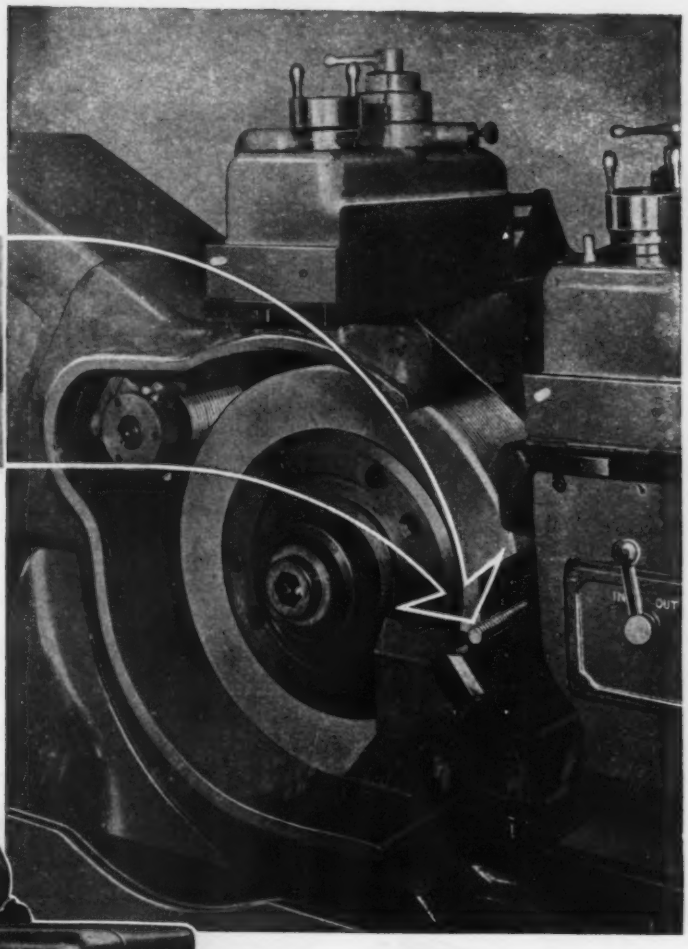
PRODUCTS OF SHARON STEEL CORPORATION AND SUBSIDIARIES: THE NILES ROLLING MILL COMPANY, NILES, OHIO; DETROIT TUBE AND STEEL DIVISION, DE MICHIGAN; BRAINARD STEEL COMPANY, WARREN, OHIO; SHARONSTEEL PRODUCTS COMPANY, DETROIT, MICHIGAN, AND FARRELL, PENNA.; CARPENTERTOWN & COKE CO., MT. PLEASANT, PENNA.; FAIRMONT COKE WORKS, FAIRMONT, W. VA.; MORGANTOWN COKE WORKS, MORGANTOWN, W. VA.; JOANNE COMPANY, RACHEL, W. VA. Hot and Cold Rolled Stainless Strip Steel—Alloy Strip Steel—High Carbon Strip Steel—Galvanite Special Coated Products—Cooperage Electrical Steel Sheets—Hot Rolled Annealed and Deoxidized Sheets—Galvanized Sheets—Enameling Grade Steel—Welded Tubing—Galvanized and Fabricated Steel Steel Strapping, Tools and Accessories.

DISTRICT SALES OFFICES: Chicago, Ill., Cincinnati, O., Cleveland, O., Dayton, O., Detroit, Mich., Indianapolis, Ind., Milwaukee, Wis., New York, N. Y., Philadelphia, Rochester, N. Y., Los Angeles, Calif., San Francisco, Calif., St. Louis, Mo., Montreal, Que., Toronto, Ont.

210 STUDS PER HOUR

CENTERLESS THREAD GROUND BY THE "THRU-FEED" METHOD





Name of Part.....Stud
Thread Specifications:
Diameter.....3/4"
Pitch.....10 USF
Thread Length.....4"
Thread Tolerance.....Class 7
Production Per Hour.....210

● The LANDIS No. 1 CENTERLESS THREAD GRINDING MACHINE

● The LANDIS No. 1 Centerless Thread Grinder is designed to grind screw threads on straight cylindrical workpieces and headed or multiple diameter parts.

Workpieces without interfering shoulders requiring threads on the maximum diameter only are ground by the "thru-feed" method—headed or shouldered workpieces by the "in-feed" method.

Either process will grind threads from the solid or finish grind precut threads. Most types of thread forms can be ground to any required class of fit and for right or left hand threads.

Write for Bulletin E-97

LANDIS MACHINE CO.
WAYNESBORO, PA., U. S. A.

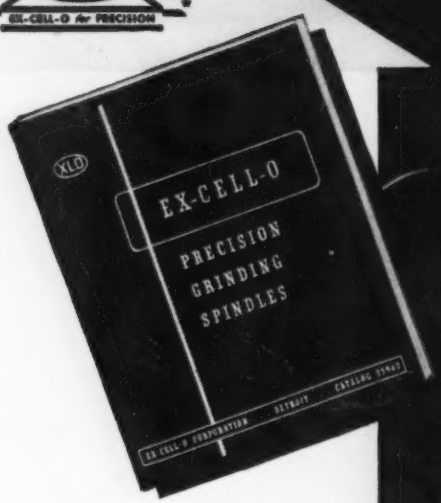
PRECISION GRINDING ELIMINATES SCRAPING

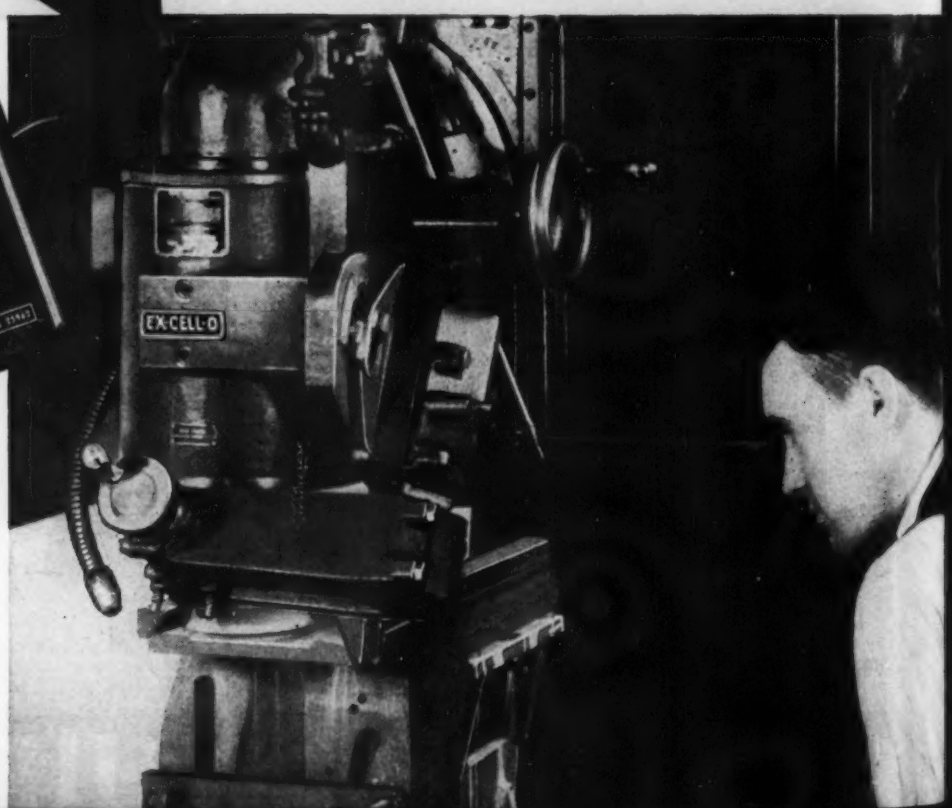
Ex-Cell-O Spindle Finishes Dovetail Ways in 1/10 the Time Formerly Required

Actual case histories show that slide ways now being precision ground in 15 minutes formerly required 2½ to 3 hours of hand scraping to obtain satisfactory bearing. Slightly larger slides that are now precision ground in 20 minutes formerly required 3 to 4 hours of hand scraping.

Ex-Cell-O spindle engineers have a wealth of experience in designing precision spindles to meet special applications. If you don't find a spindle to suit your needs in the spindle catalog, write to Ex-Cell-O stating the operation to be performed and your requirements in terms of speed, horsepower and preferred driving method. A simple sketch showing some basic dimensions is helpful, too.

XLO
EX-CELL-O for PRECISION





If you would like an Ex-Cell-O Precision Grinding Spindle Catalog without obligation, just write on your company letterhead, asking for Catalog Number 25962.

50-22

EX-CELL-O CORPORATION DETROIT 32 MICHIGAN

MANUFACTURERS OF PRECISION MACHINE TOOLS • CUTTING TOOLS • RAILROAD PINS AND BUSHINGS
DRILL JIG BUSHINGS • AIRCRAFT AND MISCELLANEOUS PRODUCTION PARTS • DAIRY EQUIPMENT

What is an Alloy Steel?

In general, an alloy steel is a grade in which one or more alloying elements have been added to impart special properties and thereby increase the value of the steel for given uses.

More specifically, an alloy steel is defined as one in which the maximum specified content of alloying elements exceeds one or more of the following limits: manganese 1.65 pct; silicon 0.60 pct; copper 0.60 pct — or, one in which there is a range or minimum quantity, within the limits of the recognized commercial field of: aluminum, boron, chromium, cobalt, columbium, molybdenum, nickel, titanium, tungsten, vanadium, zirconium, or any other element that has been added to produce a desired alloying effect.

WHEN DOES IT PAY TO USE ALLOY STEELS?

Generally, it pays to use an alloy steel when a higher degree of strength, ductility and toughness is required than can be obtained by the use of carbon steel in the section under consideration. Alloy steel should also be employed where such additional properties as resistance to corrosion, resistance to heat, and desirable low-temperature impact values are required.

With carbon steel, good mechanical properties can only be developed near the surface by proper heat-treatment. Uniform properties throughout the piece are possible only when the section of steel is relatively small.

In some instances it may require considerable study to determine when and how to use a particular alloy steel to advantage in a given product. When this is the case, our metallurgists will be glad to give impartial advice on analysis, heat-treatment, machinability and expected results.

We manufacture the entire range of AISI grades and special-analysis steels as well as carbon steels.

BETHLEHEM STEEL COMPANY
BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation—Export Distributor: Bethlehem Steel Export Corporation

BETHLEHEM STEEL

BETHLEHEM *ALLOY* STEELS

Get Increased Gear Production with High-Quality Alloy Steels

The extreme precautions that Bethlehem takes in manufacturing gear steels pay off handsomely with increased production in our customers' plants.

These steels are as clean, and as uniform in analysis as modern methods can make them. Surface flaws, internal voids, and non-metallic inclusions are held to the minimum, while chemical compositions and grain size are rigidly controlled.

Freedom from voids or surface flaws reduces the possibility of the steel splitting or opening up during forging.

The absence of inclusions adds greatly to the life of cutting tools and increases the percentage of acceptable pieces machined per tool.

Controlled analysis and grain size insure uniform response to heat-treatment and minimize distortion that would be cause for rejection.

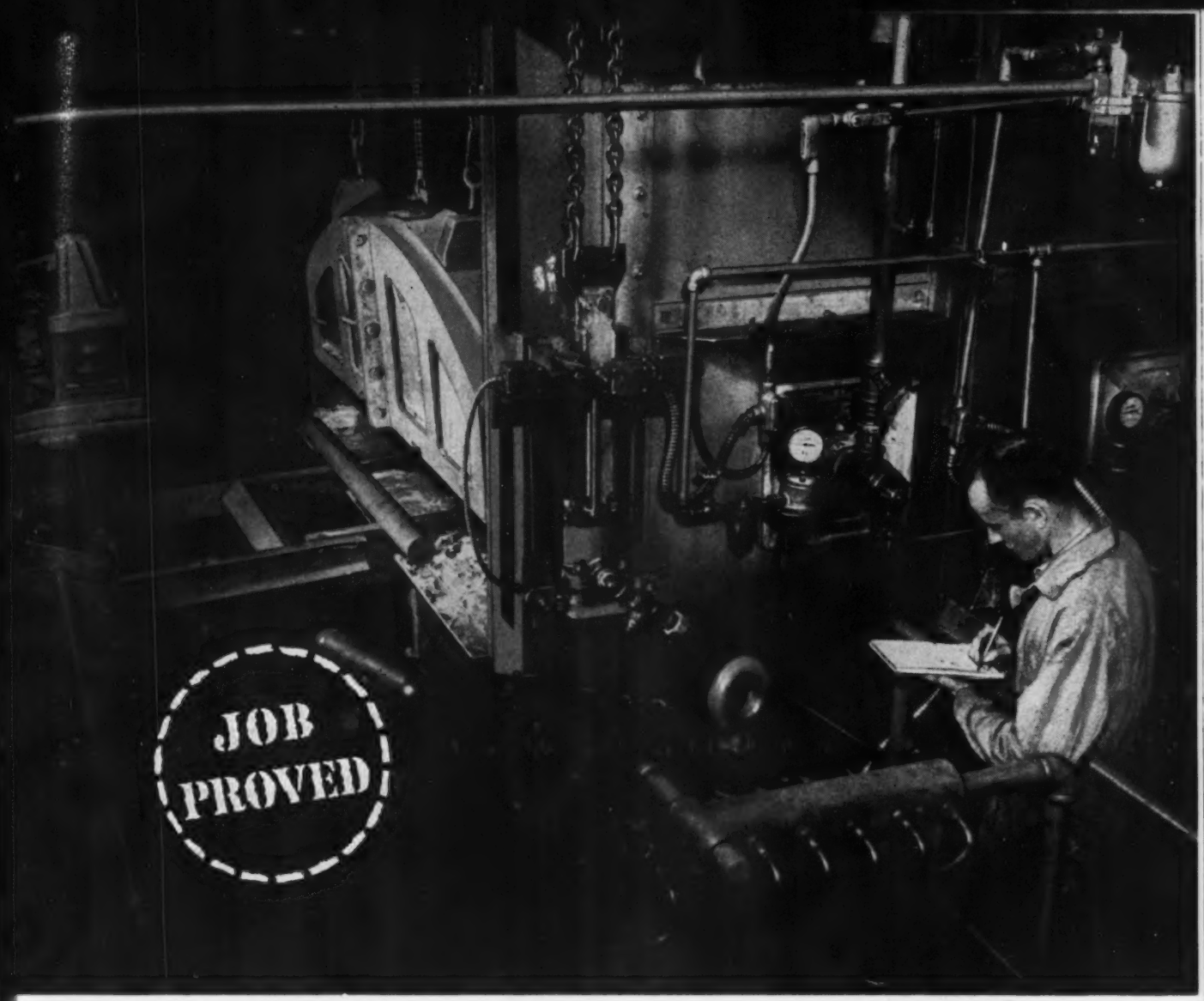
Bethlehem manufactures both carburizing and oil-hardening types of gear steels. Full information on these or any of the AISI grades is readily available.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation
Export Distributor: Bethlehem Steel Export Corporation

BETHLEHEM STEEL

BETHLEHEM *ALLOY* STEELS



HYDRAULIC SYSTEM KEPT LIKE NEW

Sunvis 916 Effects Substantial Savings; Strainers and Lines Kept Sludge-Free

A copper tubing manufacturer uses an oven with hydraulically operated doors to heat billets to approximately 1550F. The ambient temperatures around the hydraulic mechanism are abnormally high, putting the hydraulic fluid to a severe test of stability. Failure of the system would halt the piercing operation and result in costly delays throughout the plant.

Since the oven was first put in operation, three years ago, the hydraulic fluid has been Sunvis 916. The original charge has never been changed and is still in excellent condition, though the system is tight and requires only a minimum of make-up. Oil lines and strainers are completely free of sludge. Seals and packings are sound. Operations are never interrupted for oil changes or parts maintenance. The company expects to retain the original charge of Sunvis 916 in service indefinitely, effecting large savings in both oil and maintenance costs.

Sunvis 916 is a solvent-refined oil of the highest quality. It is fortified to resist the oxidation and sludging so detrimental to the efficient operation of hydraulic systems. Sunvis 900 Oils are *good for the life of your machines.* For your copy of the illustrated booklet "Sunvis 900 Oils" write Department IA-9.

SUN OIL COMPANY • *Philadelphia 3, Pa.*
In Canada: Sun Oil Company, Ltd.
Toronto and Montreal

SUN PETROLEUM PRODUCTS
"JOB PROVED" IN EVERY INDUSTRY

SUNOCO

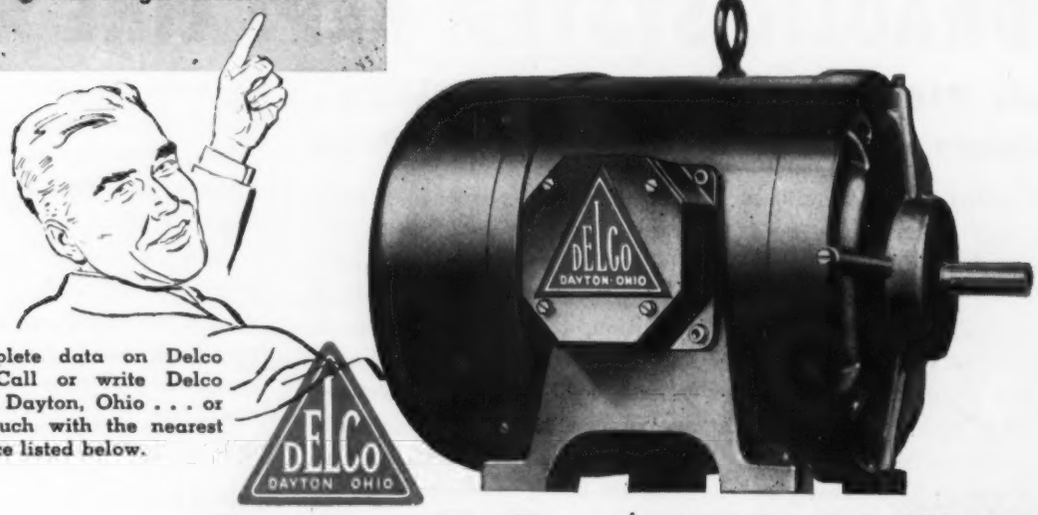
On more and more spec sheets . . .

Delco preferred!

- Positioned Bearings
- Delcote Coil Insulation
- Corrosive-Resistant Cast Iron Frame
- Positive Lubrication
- Dynamically Balanced Rotor and Shaft Assembly
- Water-Tight Conduit Box

Two words that mean top motor performance

You see the words "DELCO PREFERRED" on more and more spec sheets. That's because Delco motors are built the way production men want motors built. They are rugged, dependable, and made of the finest materials. A few of the performance extras that Delco motors give you are listed here:



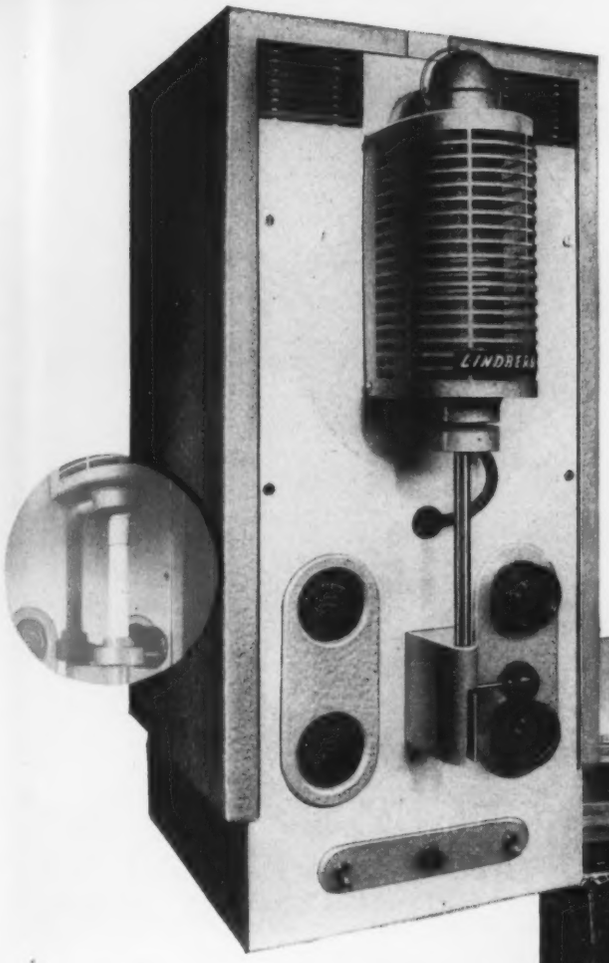
Get complete data on Delco motors. Call or write Delco Products, Dayton, Ohio . . . or get in touch with the nearest sales office listed below.

DELCO
DAYTON OHIO

DELCO MOTORS

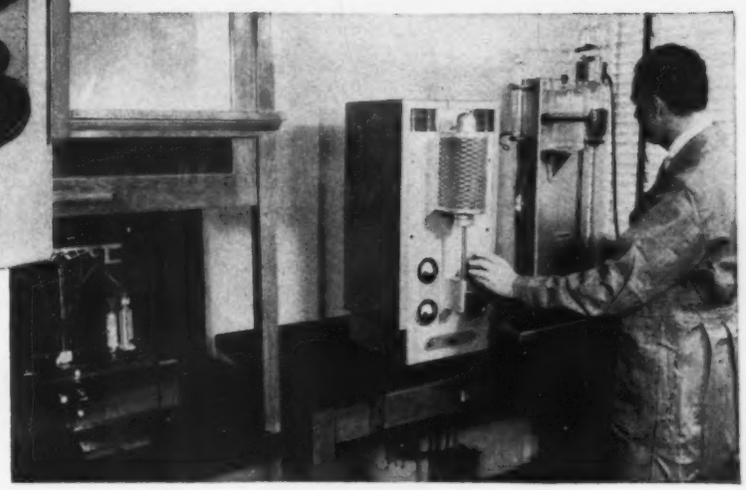
DELCO PRODUCTS, DIVISION OF GENERAL MOTORS CORPORATION, DAYTON, OHIO

SALES OFFICES: CHICAGO • CINCINNATI • CLEVELAND • DETROIT • HARTFORD, CONN.



INSTANT IGNITION

of Solid Samples



Typical laboratory installation. A Lindberg Volumetric Carbon Determinator operating with a Lindberg "H-F" Combustion Unit

The Lindberg "HF" Combustion Unit is revolutionizing carbon and sulphur determinations in laboratories throughout the country. Ready for instant use—instant temperatures above 3000° F.—for steel, cast iron, alloys, or stainless samples—volumetric or gravimetric!

A high frequency unit specially designed for the laboratory

- Ready in the morning in 57 seconds—instantly from then on.
- 90% less power consumption (maximum input 0.125 KW idling).
- Glass combustion tube provides visability of operation.
- Combustion tubes at half the cost, last many times longer.
- Shorter tubes advantageous for volumetric method.
- No elements to burn out or limit temperatures.
- Heats nothing but the sample.
- Eliminates excess heat from the laboratory.
- Inexpensive "cupelet" holds full factor weight for carbons.
- Small and compact—13" wide—28½" high—17" deep.

For further details ask for Bulletin 910.

LINDBERG LABORATORY DIVISION

2452 WEST HUBBARD STREET • CHICAGO 12, ILLINOIS

it's easy if you know how

As versatile as stainless is, you may find it difficult to apply stainless steel to your job unless you know which stainless analysis you need. That's why Crucible, pioneers in the development of this specialty steel, makes freely available to you an alert metallurgical staff. These engineers and metallurgists can show you which stainless analysis is best suited for your application. And how Crucible Stainless can be applied for maximum satisfaction.

Take full advantage of Crucible's half century of specialty steel leadership — leadership based on a keen devotion to detail . . . on every Industry-posed problem . . . whether the order is in tons or pounds. When you think of stainless . . . call in Crucible. CRUCIBLE STEEL COMPANY OF AMERICA, Chrysler Building, New York 17, N. Y.

CRUCIBLE first name in special purpose steels

STAINLESS STEELS

fifty years of Fine steelmaking

STAINLESS • HIGH SPEED • TOOL • ALLOY • MACHINERY • SPECIAL PURPOSE STEELS

Best Buy in Variable Speed!

COMPARE THESE FEATURES of *Vari-Pitch* Automatic sheave with any other variable speed drive and see why *Vari-Pitch* Automatic drive gives you more for your drive dollar.

1. Changes speeds with one hand while machine is running.
2. All mechanism is inside one sheave actuated by movement of the motor base.
3. Ample capacity and safety factor of multiple belts.
4. Full range of sizes from 1 to 40 hp.
5. Top speed is 100% higher than low speed.
6. Quiet operation.
7. Cushioned start.
8. Simple design and easy installation make cost low
9. Occupies no more space than ordinary sheave.

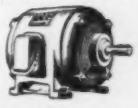
Vari-Pitch Automatic drive will pay for itself very quickly in increased production, improved quality and more flexible operation on many machines in your plant. Ask your Allis-Chalmers Authorized Dealer or Sales Office representative to give you savings and cost figures on your operations. Or write for bulletin 20B7223.

ALLIS-CHALMERS, 1019A SO. 70 ST.
MILWAUKEE, WIS.

Vari-Pitch and *Texrope* are Allis-Chalmers trademarks. A-3063

Sold . . .
Applied . . .
Serviced . . .

by Allis-Chalmers Authorized Dealers, Certified Service Shops and Sales Offices throughout the country.



MOTORS — ½ to 25,000 hp and up. All types.

CONTROL — Manual, magnetic and combination starters; push button stations and components for complete control systems.

PUMPS — Integral motor and coupled types from ¾ in. to 72 in. discharge and up.

ALLIS-CHALMERS

Only MARVEL *builds all four**

***HACK SAWING MACHINES**

***BAND SAWING MACHINES**

***BAND SAW BLADES**

***HACK SAW BLADES**

While it is true there are several builders of hack sawing machines and many builders of band sawing machines, only MARVEL builds *BOTH* hack saws and band saws. The fact is that MARVEL manufactures 35 models of 10 basic types of metal sawing machines which include the world's fastest automatic production saw, the world's largest giant hydraulic hack saws, the world's most versatile band saw and the most widely used small shop saws.

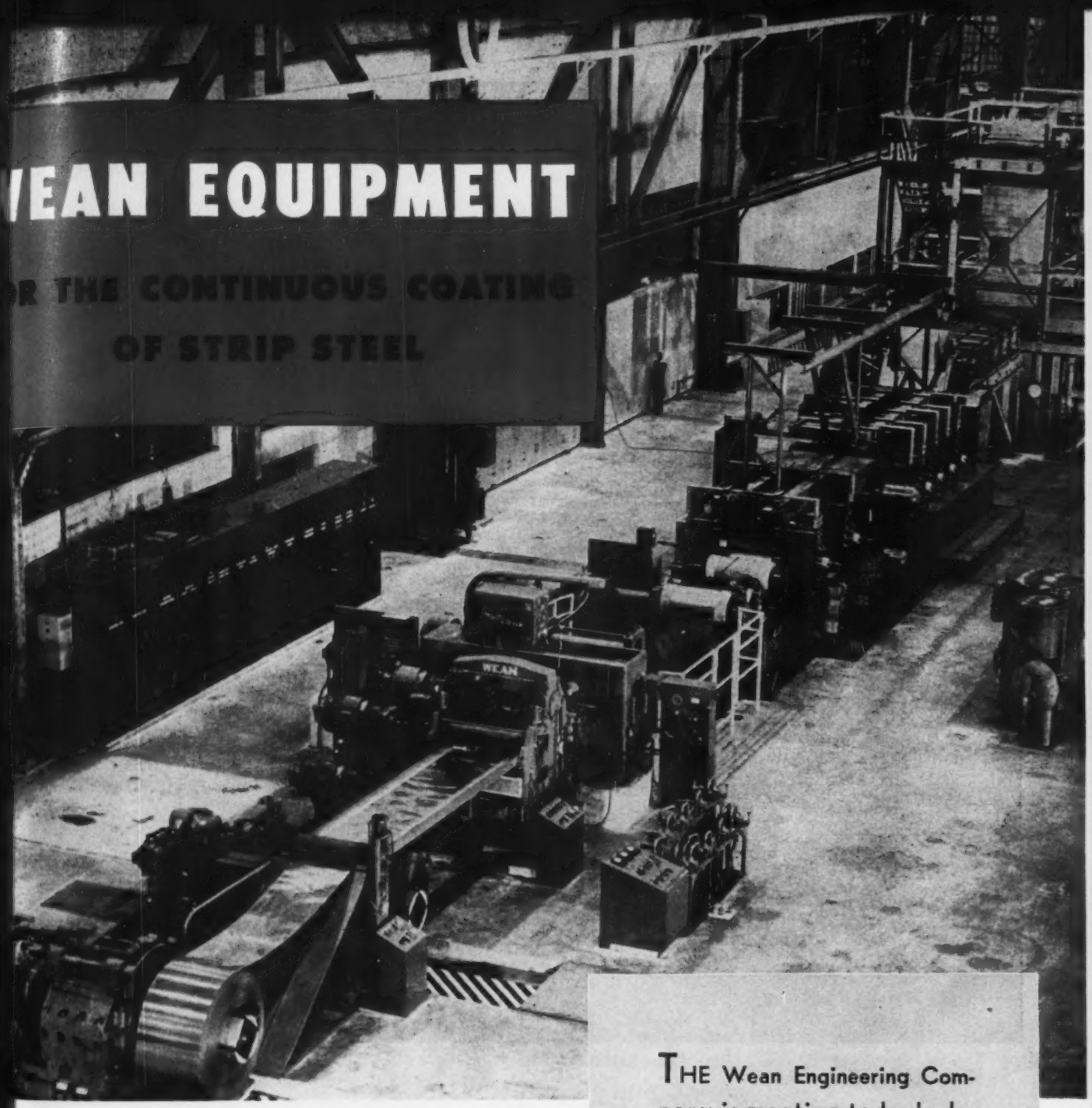
With intimate and broad field experience in all types of metal cutting-off equipment and 35 different saws available, it is obvious that MARVEL Field Engineers occupy a unique and exclusive position in the industry. They are eminently qualified to make expert and *unbiased* recommendations covering the type, size and model of metal sawing equipment best suited to individual requirements—the most efficient, most accurate, fastest, broadest in scope and the most economical.

MARVEL is also the only manufacturer of both metal sawing *machines* and metal sawing *blades*. Because the efficiencies of both the machine and the blades are interdependent, each upon the capability of the other, expert knowledge covering both saws and saw blades is essential to the proper appraisal of any specific sawing situation. Correct balance of cutting speed and blade life, feed pressure and blade tension are all potent factors in over-all performance. Here again it is the MARVEL Field Engineer who is qualified to provide the comprehensive answer to your question. His job is to help you saw metal most efficiently—his services are available upon request—gratis.

Write for Catalog 49.

ARMSTRONG-BLUM MFG. CO.

5700 Bloomingdale Ave., Chicago 39, U. S. A.



THE Wean Engineering Company is meeting today's demands for equipment to produce tin plate and zinc coated strip steel with light coatings by the electrolytic method; also equipment to produce chemically treated black plate and strip steel. Equipment for coating strip steel with zinc and other materials by the hot dip method is also available.

The WEAN ENGINEERING COMPANY, Inc.

WARREN ---------- OHIO

Associate Company—Wean Equipment Corp.—Cleveland, Ohio

SPECIALISTS IN SHEET, TIN AND STRIP MILL EQUIPMENT

BETHLEHEM HARDENED STEEL ROLLS

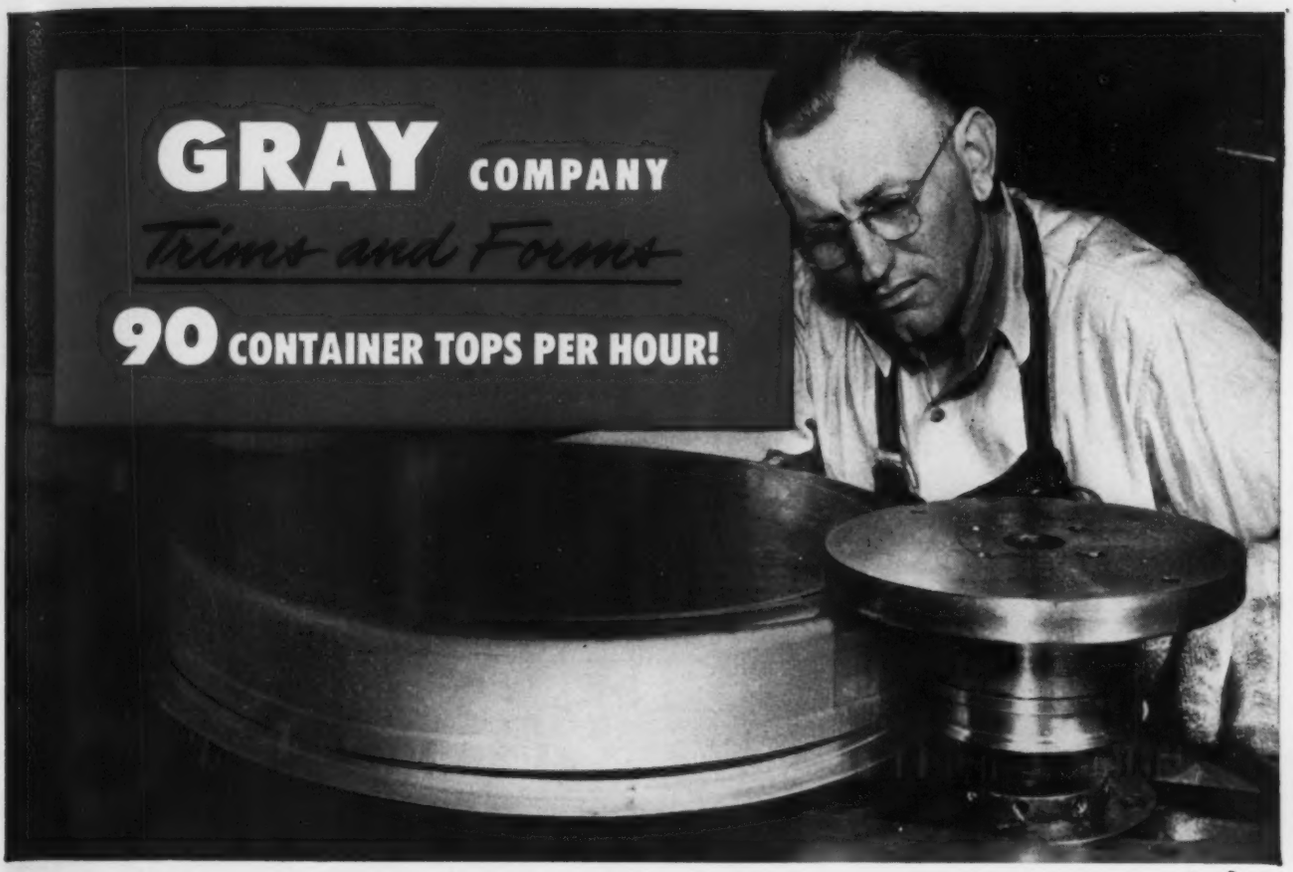
You'll find Bethlehem an always-dependable source of forged hardened steel rolls—the types used for the cold-rolling of tinplate, sheet, and strip. We furnish them in a complete range of sizes from the very small to the large, heavy-duty units that are pictured here.

At Bethlehem the making of these rolls is a job for craftsmen only; men whose special skills and training have fitted them well for this exacting work. An order placed with Bethlehem is placed in expert hands; it is your assurance that specifications will be met faithfully.

BETHLEHEM STEEL COMPANY
BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. Export Distributor: Bethlehem Steel Export Corporation.

BETHLEHEM STEEL



Gray Company, Minneapolis, Minn., trims flash and forms off-set, *simultaneously*, 90 lubricant container tops per hour. Their Whiting Quickwork Stamping Trimmer performs both these operations with dependable accuracy, processing the stampings on a production basis, eliminating the need for expensive trimming dies, saving valuable press time and cutting production costs.

Many other firms are also reducing costs with a Whiting . . . some trim stampings at rates up to 500 per hour. Some form and bead at similar rates in the same or separate passes. The Whiting easily and efficiently handles the most intricate shapes—large and small.

Whiting engineers will help you select the Stamping Trimmer best suited to your needs. Send the coupon below for complete information on this service and for the Whiting Stamping Trimmer Catalog.

WHITING *Quickwork*

stamping trimmer

WHITING ROTARY SHEARS

. . . another way to cut production costs!

Cut metal sheets quickly and accurately with a Whiting Rotary Shear. Cut straight lines, openings and odd shapes; slit narrow strips; bevel; form flanges; and joggle. The Whiting does *all* these jobs—one machine with attachments. Send coupon for complete information!

WHITING CORPORATION, 15601 Lathrop Ave. Harvey, Illinois

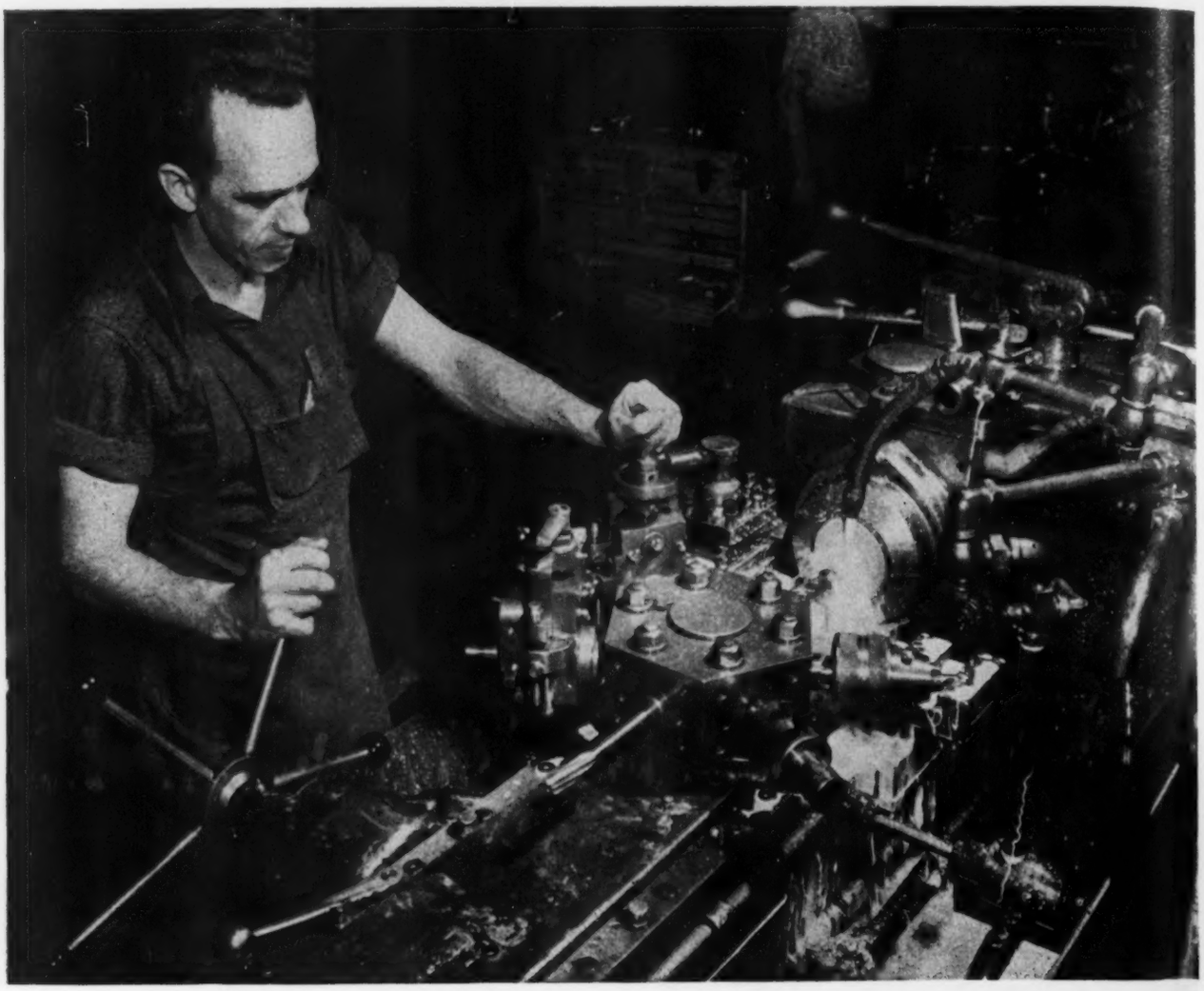
Send ☐ Whiting Stamping Trimmer Catalog
☐ Whiting Rotary Shears Catalog
☐ Name of Local Distributor

FIRM NAME

ATTENTION TITLE

ADDRESS

CITY ZONE STATE

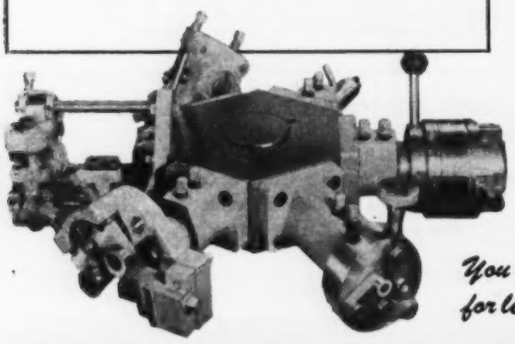


PICTURE OF A MAN PRODUCING 25% MORE

Same job, same operation, *But Better Tools!*

This shop has found it can do more jobs faster on Warner & Swasey Turret Lathes with the Standard Tooling Setups that fit their requirements. Multiple and combined cuts, with shorter setup time, mean profitable production increases.

● Electrol Incorporated, of Kingston, New York, transferred this precision Stop-Plunger job to a Warner & Swasey No. 3 Universal Turret Lathe because it had the speed and accuracy required, as well as the proper tooling for the job. The result was a 25% increase in production of this high pressure hydraulic control part.



Permanent Universal Tooling setups and the right tools which can help you increase your output are all in the new 194 page Warner & Swasey Tool Catalog. Write for your copy.

You can machine it better, faster, for less...with a Warner & Swasey

WARNER & SWASEY
Machine Tools
Cleveland

TURRET LATHES, MULTIPLE & SINGLE SPINDLE AUTOMATICS, PRECISION TAPPING AND THREADING MACHINES

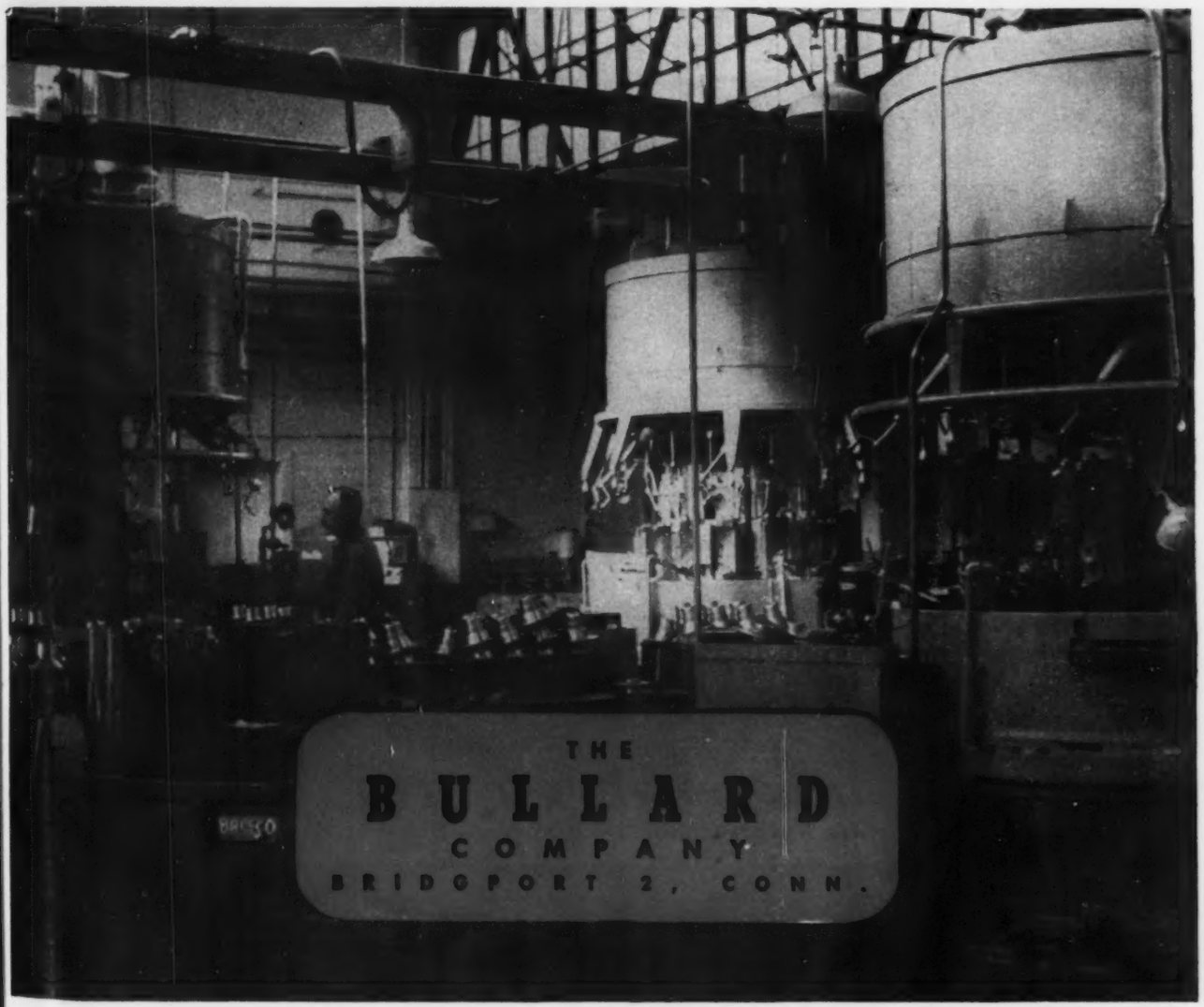
KEEPING PACE WITH TIME . . .

Bullard Mult-Au-Matics

at Spicer Manufacturing Division of Dana Corporation, Toledo, Ohio

Some 30 Mult-Au-Matics — eight spindle type, in 12 and 16 inch sizes, produce a variety of automotive parts. Naturally these machines were installed because of their productive capacity. Since, one Mult-Au-Matic produces the equivalent of three former machines which it replaced. Furthermore, the customer expressed satisfaction with the dependable performance of these machines and remarked on the economies possible with Mult-Au-Matics.

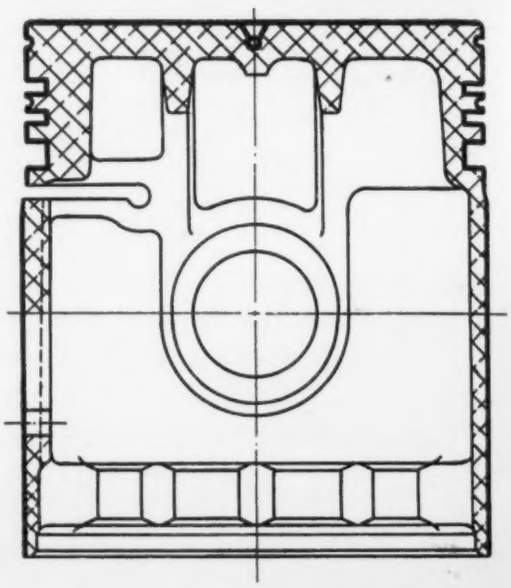
Write BULLARD for Factual Time Savings on your Jobs



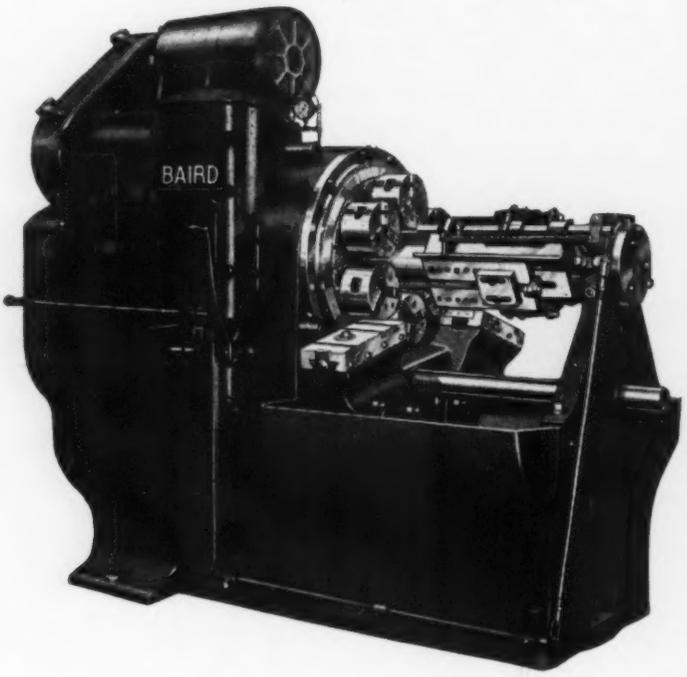
Elliptical TURNING

The mechanical drawing opposite is of a 3 5/16" by 3¾" long aluminum alloy piston. It was held in a mechanically operated expanding pin type chuck and centered on a previously finished land, inside the skirt of the piston.

The piston was rough and finish turned at the skirt end; elliptical O.D.; DOME and 5 grooves and dome centered and grooves chamfered.



243 per hour



BAIRD
No. 76H *Automatic* CHUCKER

Some Exclusive Features:

- **INDEPENDENT TOOL SLIDES**
  The longitudinal tool slides may have different strokes and the cross slides are independent and have their strokes, all as best suits the job. All tool slides have micrometer adjustment.
- **DIFFERENT SPEEDS AT SPINDLES**
  Ability to choose a speed for the spindle at each work station to suit the operation to be performed at that station permits the best product in least time.
- **AUTOMATIC CHUCKING**
  Operator has both hands free to handle the work. No levers or handles to require his attention or take his time.
- **ATTACHMENTS**
  Several readily applied attachments are available to perform extra operations and reduce handling, thus speeding production.
- **AUTOMATIC MECHANICAL STOP**
  Stops machine at end of each cycle if operator has not unloaded and reloaded in the proper operation of machine. This and other safety features make for least loss due to damage and for greatest safety.

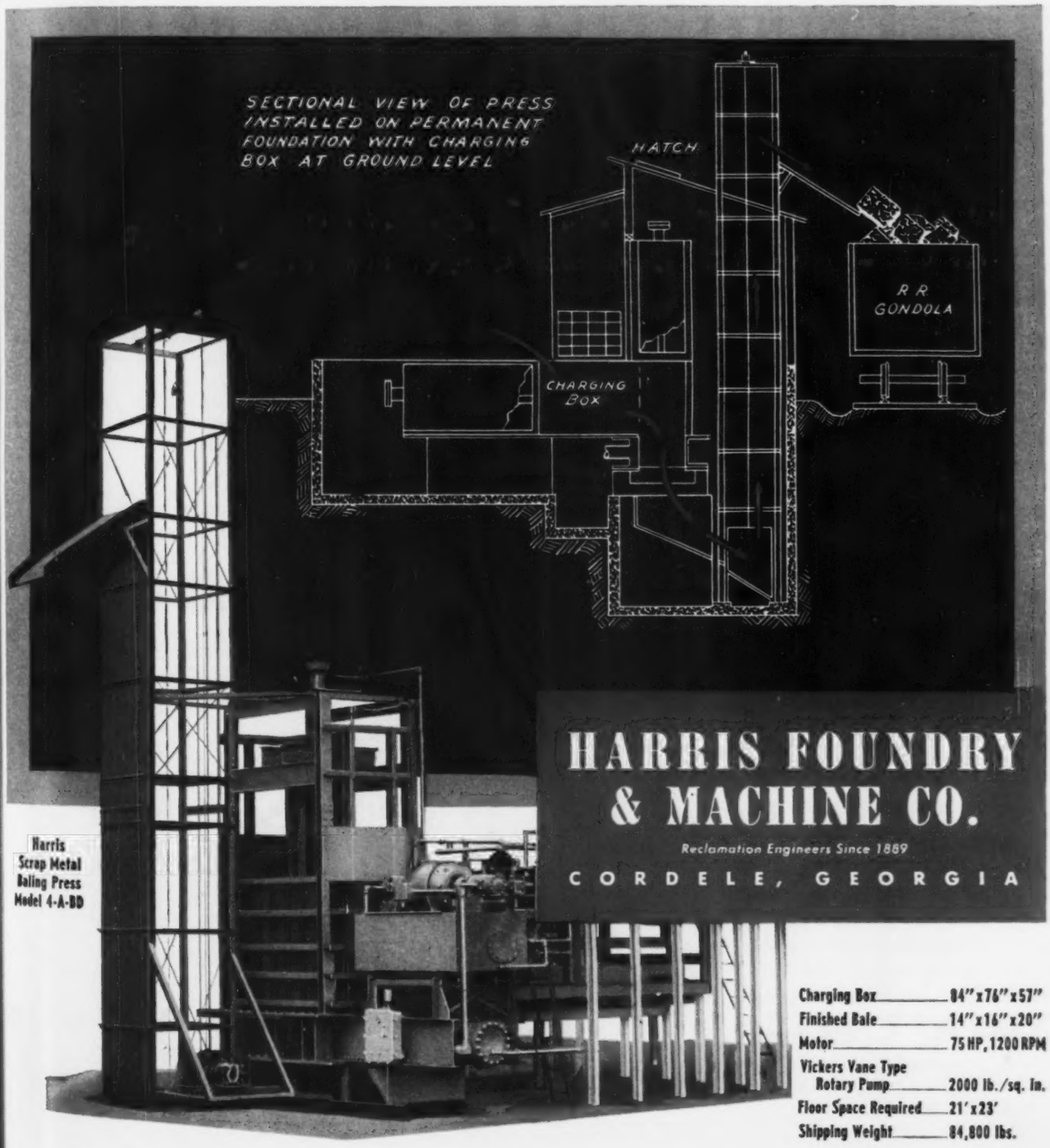
"ASK BAIRD ABOUT IT"

OTHER BAIRD MACHINES: MULTIPLE SPINDLE GRINDERS, WIRE FORMING MACHINES, PRESSES, TUMBLING EQUIPMENT

THE BAIRD MACHINE COMPANY
STRATFORD, CONN.

THE NEW HARRIS PRESS
WITH BOTTOM DROP OUT FOR BALES
Faster • Cleaner • More Profitable

The new Harris Press with its revolutionary bottom drop-out design averages 38 to 43 bales an hour (avg. wt. 300 lbs.) That's 6½ tons every sixty minutes! This extra speed means extra profits for you. Our engineers stand ready to advise and help on every installation. Write for full details on this sensational new Harris Press . . . Model 4-A-BD.


SECTIONAL VIEW OF PRESS INSTALLED ON PERMANENT FOUNDATION WITH CHARGING BOX AT GROUND LEVEL
HATCH
R R GONDOLA
CHARGING BOX
HARRIS FOUNDRY & MACHINE CO.
Reclamation Engineers Since 1889
CORDELE, GEORGIA

Harris Scrap Metal Baling Press Model 4-A-BD

Charging Box	84" x 76" x 57"
Finished Bale	14" x 16" x 20"
Motor	75 HP, 1200 RPM
Vickers Vane Type Rotary Pump	2000 lb./sq. in.
Floor Space Required	21' x 23'
Shipping Weight	84,800 lbs.

GRAY IRON
FOUNDERS' SOCIETY'S
22nd ANNUAL MEETING

to be held at

NETHERLAND PLAZA HOTEL

CINCINNATI, OHIO

OCTOBER 12 • 13, 1950

The Annual convention of gray iron foundry executives and managers will feature addresses by outstanding authorities on

- **Cost Accounting—Cost Cutting—Cost Control**
- **Industrial Safety**
- **Labor Relations**
- **Marketing and Sales Promotion**
- **Design and Technical Problems**
- **Business Outlook and Washington Developments**

There will be **. . . gala social events • informal get-togethers • shop talk • comraderie.**

for profit and pleasure

DON'T MISS IT...PLAN NOW TO ATTEND

Bulletin on SUPER REFRACTORIES

by CARBORUNDUM
TRADE MARK

NO. 10 SEPTEMBER, 1950

How Can Super Refractories Justify Their Higher Initial Cost?

In adjudging the value of a super refractory for a particular job, price should not be the sole determining factor. *Their overall usefulness and the savings they can effect should be the measure of their worth.* Refractory cost per unit handled is a good yardstick.

With their exceptional resistance to furnace atmospheres, thermal shock, slags, cracking, mechanical wear and high temperatures, super refractories by CARBORUNDUM give exceptionally long service. They also extend the life of adjacent refractories, eliminate frequent furnace outages, increase production, and decrease replacements and labor costs.

Another unique property of certain super refractories that often justifies higher initial cost, is high thermal conductivity. This provides quicker, more uniform heat delivery to the charge. Material quality is bettered, fuel consumption reduced, rejects cut, and output improved.

Still other benefits are to be gained in certain other types of installations. These applications, too, are usually limited to areas which cause repeated costly repairs and shut-downs.

Super refractories by CARBORUNDUM are most often applied where other refractories, for any of many reasons, are incapable of doing an adequate job.

Physical Properties of Super Refractories by CARBORUNDUM
Trade Mark

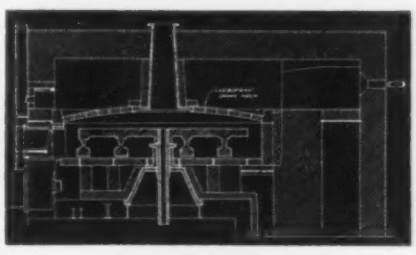
	CARBOFRAX Silicon Carbide	MULLFRAX Electric Furnace Mullite	MULLFRAX S Converted Kyanite	ALFRAX K Electrically Fused Alumina	ALFRAX B Electrically Fused Alumina	ALFRAX BI Electrically Fused Alumina
Heat Conductivity at 2200° F. in BTU/hr. sq. ft. and °F./in. of thickness	109 BTU	16 BTU	9 BTU	24 BTU	12 BTU	7 BTU
REFRACTORINESS PCE CONE	37-40	38-39	37-38	37-39	39-40	38-39
SPALLING RESISTANCE	High	High	High	Good	Good	Good
ABRASION RESISTANCE	High	Medium	Medium	High	Medium	Low
THERMAL EXPANSION (25° — 1400° C.)	.0000044	.0000059	.0000069	.0000074	.0000086	.0000086
MODULUS OF RUPTURE @ 2460° F. PSI	800-3125	100-250	175-475	100-1050	100-225	50-100
WEIGHT 9 IN. STRAIGHT	9.25 lbs.	9 lbs.	8 lbs.	10.1 lbs.	7.25 lbs.	4.8 lbs.

Here's How Super Refractory Skids Justified their Cost

Since the metal skid rails in this furnace were replaced with CARBOFRAX silicon carbide rails, output has increased and maintenance dropped. This furnace is used for heating and reforming splice bars at about 2300° F. The 2½" round, low carbon steel skids required complete replacement every six weeks. Two full working days were lost — shutdowns were costly. And even between replacements, the metal skids warped badly and required straightening.

Now, however, long uninterrupted production has been achieved. The CARBOFRAX skids have been in operation for *over 2 years* — and have required *no attention.* And as much as 35.4 tons of bars have been pushed through the furnace in seven hours.

The same unique properties of these CARBOFRAX skids have also made possible similar improvements in other reheating furnaces.



Super Refractory Doubles Furnace Output

When the fireclay dome in this Mannhiem type muriatic acid furnace was replaced by a CARBOFRAX silicon carbide arch *output was doubled.* What's more, this changeover cut the fuel input ratio by 50%.

In terms of initial furnace investment, this means that two furnaces equipped with CARBOFRAX arches *will out-produce four identical furnaces*

"Carborundum," "Carbofrax," "Mullfrax," "Silfrax," "Alfrax" are registered trademarks which indicate manufacture by The Carborundum Company

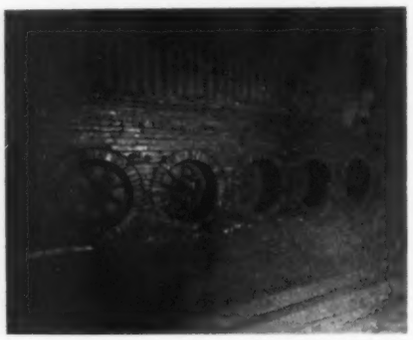
Address all correspondence to: Dept. B-90, THE CARBORUNDUM COMPANY, Refractories Division, Perth Amboy, New Jersey

Continued on other side →

⟵ Continued from other side

having fireclay arches. The savings in maintenance, labor and fuel costs are obvious.

One of the unique properties of CARBOFRAX shapes making this possible is a thermal conductivity 11 to 12 times that of fireclay (nearly equivalent to that of alloy steel at high temperatures). Another characteristic is the high hot strength of CARBOFRAX brick and shapes. At 1350° C, for example, the modulus of rupture is well over 3000 psi. Furthermore, shrinkage is practically non-existant. Measured cold after 1¾ hours at 1500° C, actual tests show zero linear contraction. As a result, serious distortion — even with spans of 20 feet or more — is avoided, and dome life is much improved.



Maintenance Savings Pay for These Brick

Pictured here is the front wall of a 150,000 lb. per hr. pulverized coal fired boiler. The photo was taken three years after the CARBOFRAX silicon carbide burner rings had been installed and following the annual pointing-up and cement wash coating of the inner faces. None of the brick had been reset. The CARBOFRAX rings have resisted the abrasive action of the fuel as well as the spalling condition promoted by the secondary air around the burners. Considerable additional service is expected from these brick.

CARBOFRAX brick have been used to face the front wall above and around these burner rings. Previously, slag fingers built up on this wall, extended down over the burners and distorted the flame. As a result, it was necessary to shut down each month to bar off the slag. Now, however, slag fingers do not build up on the hard, dense face of the CARBOFRAX wall and these monthly shutdowns have been eliminated. Consequently, the operator considers that labor and maintenance savings alone have paid for the brick.

Tile Manufacturer Increases Car Capacity 40%

By changing from clay saggers to open settings with CARBOFRAX silicon carbide setter tile, I-beam posts and saggers, this floor and wall tile manufacturer increased car capacity approximately 40% — with no change of kiln schedule.

In this operation, bisque wall tile are fired on CARBOFRAX tile. The setter slabs and ware are carried on 3-point support of I-beam posts. Floor tile are burned in CARBOFRAX saggers on top of the car. And after each trip, the cars are torn down and rebuilt.

The high mechanical strength, freedom from warping and blistering, and resistance to thermal shock of CARBOFRAX kiln furniture, have resulted in important savings to this company. Super refractories by CARBORUNDUM and engineered car settings have made the difference — as has been the case in many other ceramic plants.

Super Refractory Proves Profitable for Incinerator Operation

This photo shows part of the interior of an incinerator operated by a large industrial city. The furnace is approximately 8′ x 24′, and operates at 1700° — 2400° F. CARBOFRAX silicon carbide brick are used from the grate level to the tubes, and CARBOFRAX shapes are used around the four stoking door openings.

Note the excellent condition of the CARBOFRAX brick after more than three years service. Note, also, the absence of fly ash and other accumulations despite the fact that these walls had not been cleaned for 1½ years. Compare this with the deposit above the tubes where other refractories are used. The difference is particularly pleasing to the operator because, with fireclay, brickwork was always pulled away in the process of removing these accumulations. Moreover, CARBOFRAX brick are very resistant to erosion and cutting back — an added problem when other types of linings were used.

Before the installation of CARBOFRAX brick, this incinerator needed complete rebuilding every two years, plus patching and replacements during this period. Now, however, periodic repairs have been eliminated, and even after three years CARBOFRAX brick still are satisfactory for considerably more service.

The high refractoriness, cracking and spalling resistance, and excellent hot strength of CARBOFRAX brick have been used advantageously in this job. Other product properties of special value around the stoking doors are resistance to thermal shock and mechanical abrasion.

This is another example of how the benefits of super refractories by CARBORUNDUM more than justify their original cost.

To obtain facts and figures on installations in specific fields merely select from this list of bulletins. Copies will be sent you at once. No obligation, of course.

- Super Refractories by CARBORUNDUM (general catalog)
- Super Refractories for the Ceramic Industry
- Super Refractories for the Process Industry
- Super Refractories for Boiler Furnaces
- Super Refractories for Heat Treatment Furnaces
- Super Refractories for Gas Generators
- The Frax Line of Cements
- CARBOFRAX Refractory Skid Rails
- Porous Media for Filtration & Diffusion

Dept. No. B-90

THE CARBORUNDUM COMPANY
Refractories Division
PERTH AMBOY, NEW JERSEY

Metal sculpture executed in Weirzin steel by Lyman Beckwith. Cutting and shaping of figures demonstrates exceptional qualities of Weirzin electrolytic zinc coated steel.

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So paste this thought in your hat for the products you are manufacturing. They will provide more lasting satisfaction . . . at lower cost with steel!

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- *Weirite Tin Plate and Tin Mill Products*
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- *Weirton High-Carbon Cold-Rolled Spring Steel*
- *N-A-X High-Tensile Steel*

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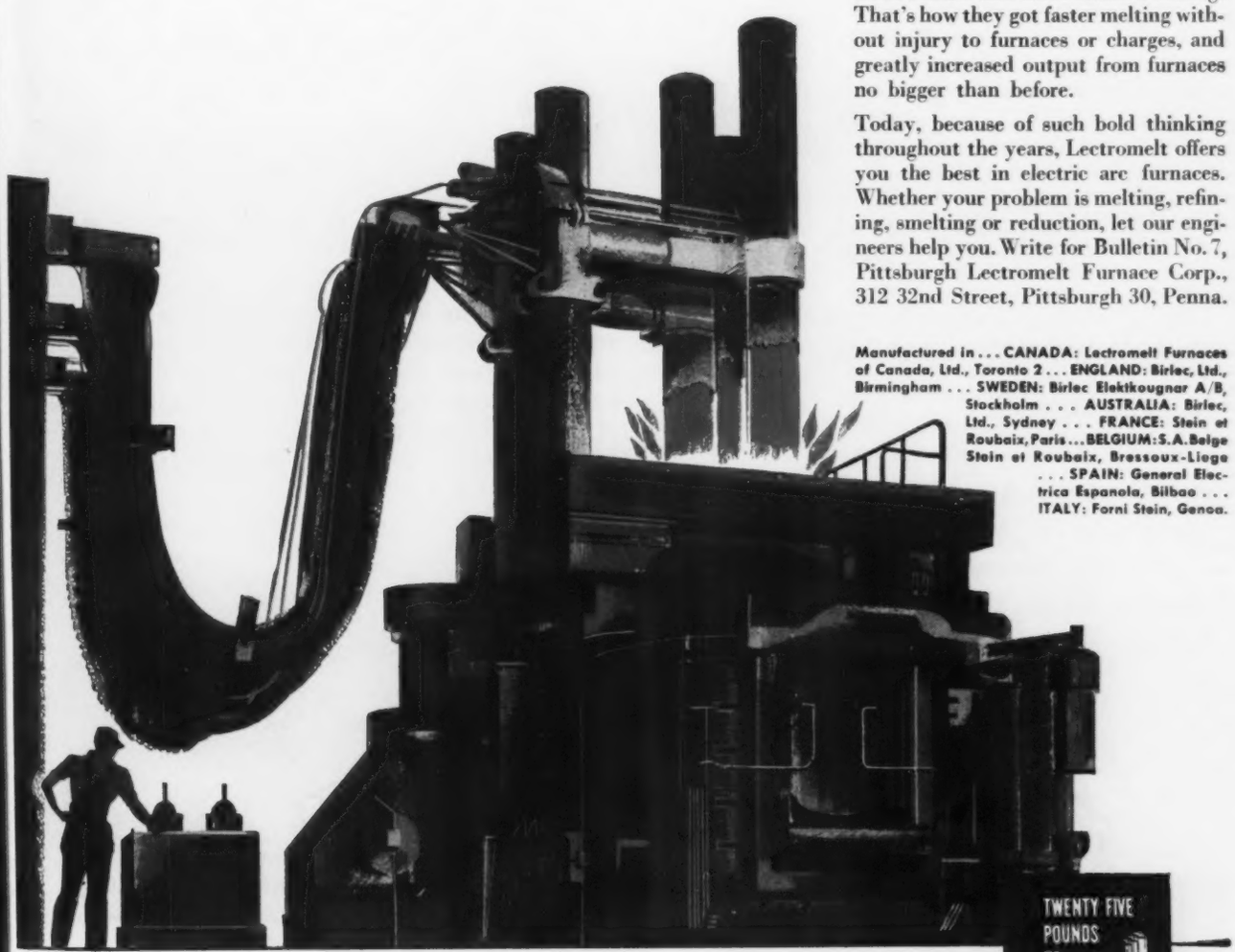

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COST COMPARISON CHART

	FORMER METHOD	WHEELABRATOR METHOD
MACHINE	5 tumbling mills	2 Tumblast Cabinet
DAILY LABOR	72 man hours	36 man hours
COST PER TON	$5.27	$2.14

SAVINGS

Per Ton $3.13

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SOIL PIPE

COST COMPARISON CHART

	FORMER METHOD	WHEELABRATOR METHOD
MACHINE	5 tumbling mills	Tumblast Cabinet
DAILY LABOR	72 man hours	36 man hours
COST PER TON	$5.50	$1.39

SAVINGS

Per Ton $1.50

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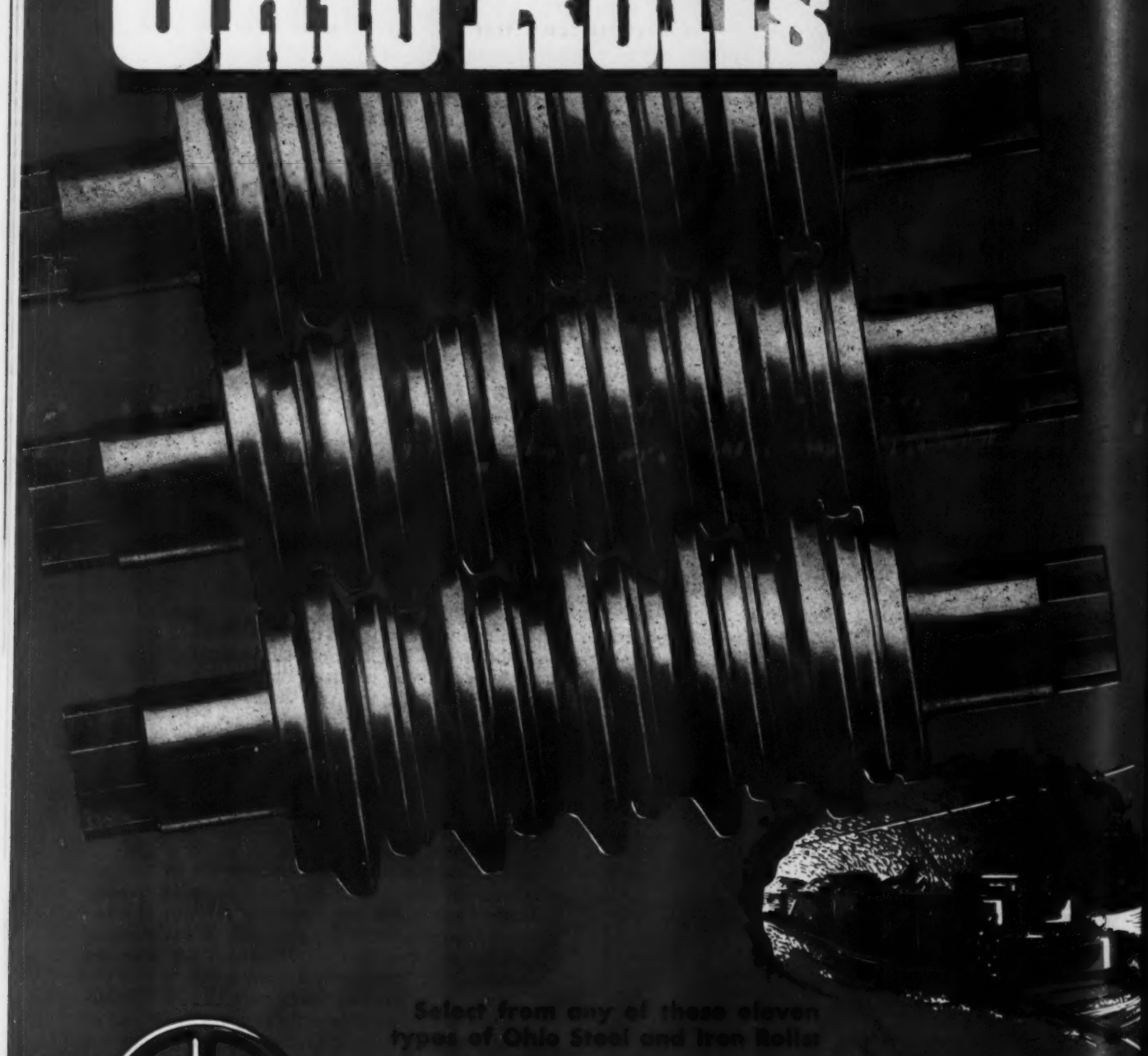

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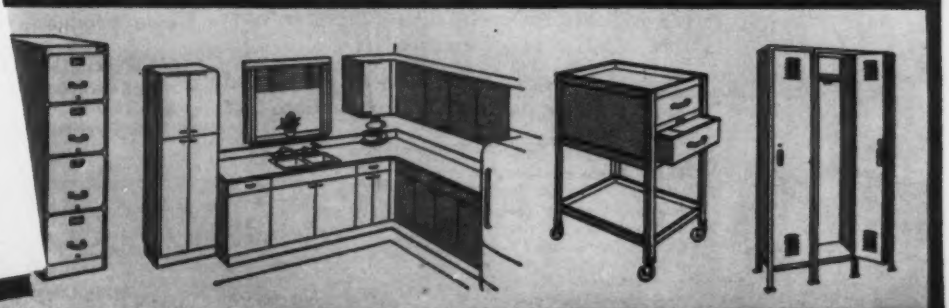

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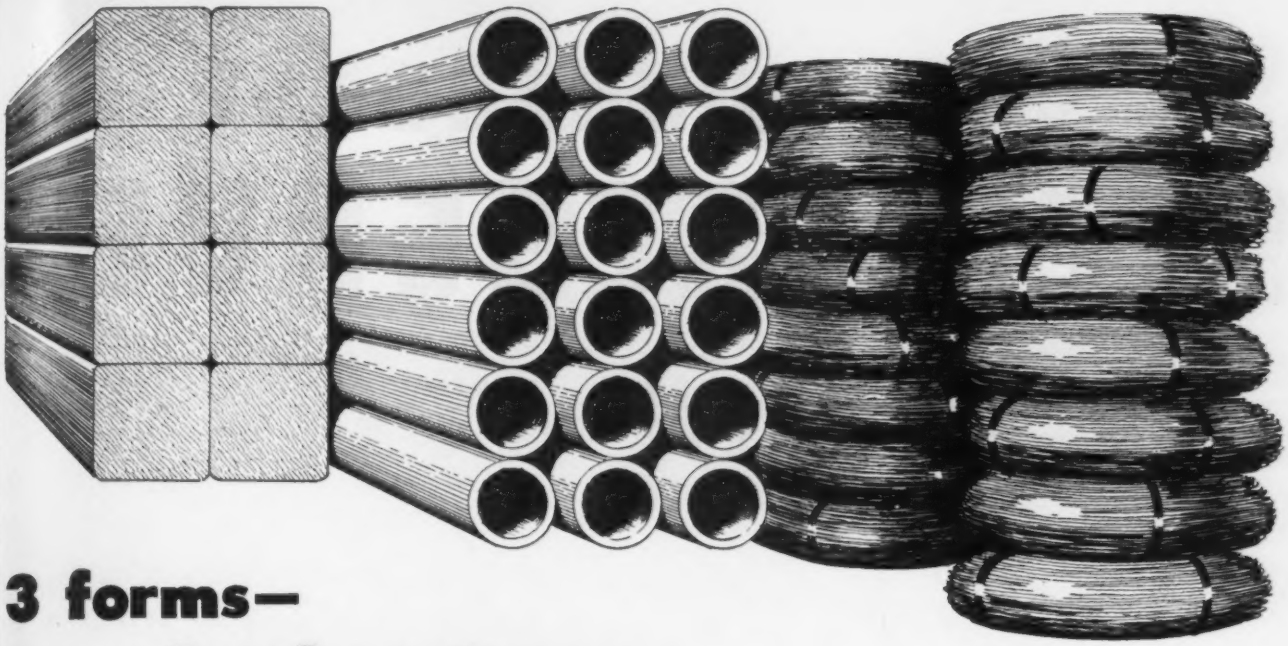

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Upper left: Stoker hoppers being carried from baking oven on roof of plant to the inspection department on the floor below, cooling as they go, by 400 ft. Link-Belt Overhead Conveyor.

Above: Metal parts of various sorts are carried through infra-red drying ovens by Link-Belt Overhead Conveyors enroute to the final assembly.

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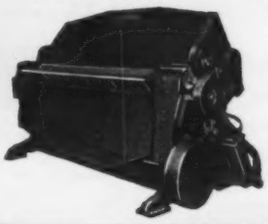

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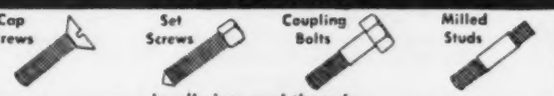


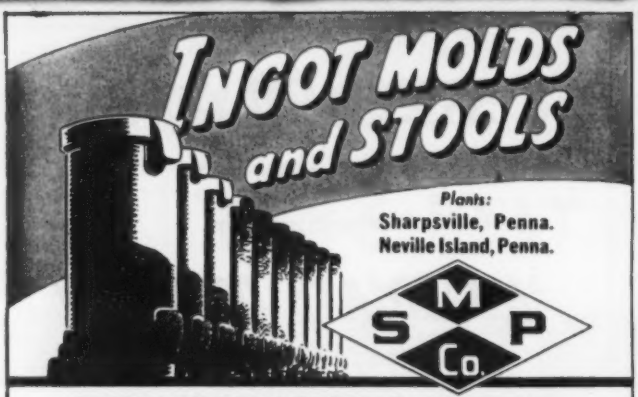
. . . in all sizes and threads.

STRAYER ELECTRIC

● Erie Strayer-Electric buckets either AC or DC are standardized in 7 sizes ½ thru 2 cu. yard capacities. Motor in bucket head controlled by man in crane cab—Bucket hooks-on for intermittent bucket and crane hook work. Write for details. Address 809 GEIST RD.

ERIE STEEL CONSTRUCTION CO • ERIE, PA.

AggreMeters • Buckets • Concrete Plants • Traveling Cranes



SHENANGO-PENN MOLD COMPANY
Oliver Bldg., Pittsburgh, Penna.

Acorn Brand
A high speed, heavy duty crank pin metal.

Cadman Pittsburgh
Master Makers of Fine Bearing Metals Since 1860

Bearite Brand
A mill, railroad, and general purpose metal.

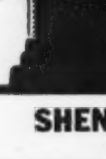
BABBITT METAL

Ninety years of successful bearing metal manufacture.

A. W. Cadman Mfg. Co., Pittsburgh, Pa.
Established 1860

A Perforating Service to Industry Since 1883

AVAILABLE in patterns to suit all industrial and ornamental uses.
GAUGES from tissue thickness to 1" steel plates or equivalent.
RANGE round perforations from .020" to 9" — slots from .006" wide.
MATERIALS include any metal and most sheet materials.
ACCURACY accurate, uniform holes; tolerance held as close as ± .0005" when necessary.
FABRICATION perforated sheets rolled, formed or otherwise fabricated to order.



CATALOG No. 62 gives full details—write for it!

The Harrington & King Perforating Co.

5657 Fillmore St., Chicago 44, Ill., 114 Liberty St., New York 6, N. Y.

STEEL, ALUMINUM, BRASS, COPPER and Alloys, Sheets, Plates, Bars, Profiles, Wire and Pipe.

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European Mill Representatives
152 W. 42nd ST. NEW YORK (18), N. Y.
LOngacre 4-0613

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The VEO Press Company
HUDSON, NEW YORK

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Established 1883
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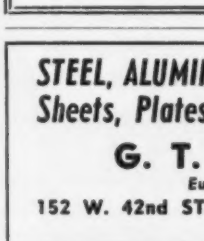

HAYWARD BUCKETS

Use this Electric Motor Clam Shell for rehandling bulk materials in Industrial Plants.

THE HAYWARD CO., 40-50 Church St., N.Y.

LELAND-GIFFORD DRILLING MACHINES

- Individually Motored Spindles
- Single or Multiple Heads
- Hand, Power or Hydraulic Feed
- High Speed Tapping Attachments

LELAND-GIFFORD COMPANY, WORCESTER, MASSACHUSETTS

IMPORTED STEEL

Suitable Tonnages : 1950 Shipment

Bright Hard Drawn Wire.
Galvanized Barbed Wire.
Sheet & Plate. Pipe, Tube & Casing.

Other products available

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110 William St. New York 7, N. Y.
Tel. WOrth 2-4396 & WOrth 2-4397

11

Got the habit of reading page 11? Newsfront is there EVERY week. Designed to save you time and keep you up to date on what's new in the industry.

IT PAYS TO READ IRON AGE ADS TOO.

CONSIDER GOOD USED EQUIPMENT FIRST

ANGLE BENDING ROLL
#0A Buffalo Angle Bending Roll, Motor Driven, Capacity 1½x1½x3/16" Angles

BALER—METAL
Model 4-A-BD Harris Metal Scrap Baler, Size of Box 84x76x58". Size of Bale 14x16x20"

BENDERS—PIPE
No. 500 Wallace 1⅝" Bending Machine. Motor Drive, 180°. Motor Driven, Fully Automatic, Hydraulic

BENDING ROLLS
6'x1¼" Bertsch Initial Type, Motor Driven
10'x⅝" H & J Pyramid Type, Belt Driven
12'x½" Pyramid Type Plate Bending Roll
16'x¾" Pyramid Type Plate Bending Roll
18'x¾" H & J Pyramid Type, Motor Driven
26'x1" Southwark Pyramid Type, Motor Driven
29' No. 3½ H & J Pyramid Type, Motor Driven

BOLT THREADING MACHINE
2" Landis Single Head, Equipt with Lead Screw

BOLT TRIMMER
Waterbury Farrel #3 Bolt Head Trimmer, Capacity 1"

BORING MILLS
84" Cincinnati Hypro Vertical Boring Mill 3 Head
84" Morton Boring, Drilling, Milling, Planing & Slotting Machine, No. 11 Morse Taper

BRAKE—LEAF TYPE
10'x⅝" Dreis & Krump No. 207, Motor Driven
12'x½" Dreis & Krump No. 228, Motor Driven

BULLDOZERS
70 Ton Steelweld, Motor Driven, 18" Stroke, Face of Crosshead 9" x 52"
150 ton Wood Horizontal Hydraulic Bulldozer
No. 29U Williams White Bulldozer—Late Model
No. 23 Williams White Bulldozer

CRANES—OVERHEAD ELECTRIC TRAVELING

5 ton Robbins Myers	28'6" Span 220/3/60
5 ton Shepard-Niles	27'3" Span 230 Volt DC.
5 ton Wright	47' Span 140/3/60 AC.
5 ton Whiting	52' Span 440/3/60 AC.
5 ton OET	56' Span 220/440 AC.
7½ ton Harnischfeger	31'1" Span 230 Volt DC.
10 ton Northern	50' Span 230 Volt DC.
12 ton P & H	28'6" Span 110 Volt DC

100 ton Harnischfeger, 50' Span 220/3/60, 2—50 Ton Trolleys, 10 ton Auxiliary

CRANE—GANTRY
Model 200 Colby Electric Powered Whirley Crane, Complete with elect. equip. 440/3/60. Capacities 45 ton @ 30' Radius to 10 Ton @ 89' Radius

CUT OFF MACHINE
Yoder Model M Hydraulic Rotary Cut Off Machine, 10 Ft. Bed, Max. Capacity 4" O.D. x .188"

DIE SINKING MACHINE
Keller Duplicator Type BL2416. Complete with Accessories

EYE BENDER
William White. Capacity 1¼" Round stock bent hot. ¾" Round stock bent cold

FLANGING MACHINE
½" McCabe Pneumatic Flanging Machine

FORGING MACHINES
1¼" Pawtucket
2", 2½", 3", 4" Ajax
2", 3", 4", 5" National

FOUNDRY EQUIPMENT
15" x 20" American Wheelabrator Tumblast
36" x 42" American Wheelabrator Tumblast
2332-38 Osborn Jolt Squeeze Rollover Machine
No. 3 American Wheelabrator Multi-table, Four 48" Dia. Auxiliary Tables
Pangborn Rotoblast Bar Cleaning Equipment, Handles stock 4" dia. x 12' to 40' long

FURNACES
1½ ton Moore Size "Q" Rapid Electromelt Furnace. Complete with Transformer Equipment
2 Ton Heroult Nose Tilt Type Melting Furnace
3 Ton Heroult Rocker Tilt Type Melting Furnace
6 Ton Moore Type "O" Lectromelt Furnace

GEAR REDUCERS
400 H.P. Westinghouse Reduction Unit Ratio 3:76-1
500 H.P. Mesta Double Reduction Ratio 14:1
600 H.P. Falk Single Herringbone Gear Reducer 360/40 RPM

GENERATOR—TURBO STEAM
750 KW Allis Chalmers Turbine with 750 KW Generator 480 volt 3 phase 60 cycle

HAMMERS—BOARD DROP
1200, 2000, 2500 lb. Chambersburg
1000 lb. Billings & Spencer

HAMMERS—STEAM DROP
35,000 lb. Chambersburg
1500, 2800 lb. Erie

HAMMERS—STEAM FORGING
600, 1200, 1500, 2000, 2300, 4000, 6000 lb. Chambersburg
1000, 1100, 1500 lb. N-B-P
1100, 1800, 3500, 12,000 lb. Erie
8000 lb. Morgan

HAMMERS—MISCELLANEOUS
1000# Chambersburg Pneumatic Motor Driven Forging Hammer, Complete with Motor
30"x24", 36"x48", 48"x48", 48"x66" 96"x60 Chambersburg Ceco Stamp Hammers

MAGNET
65" Type "SW" Size 6 EC&MCo 230 Volt DC Magnet

MANIPULATOR
3000 lb. Alliance Manipulator Bridge Type Revolving Trolley, Comp. with Motors

MOTOR GENERATOR SET
1000 KW General Electric 600 Volt DC Generator direct connected to 1450 HP 2300/2/60 Motor

NAIL MAKING MACHINES
No. 2 Glader Nail Sizes 6D, 7D, 8D, 9D
No. 1½ National Nail Sizes 10D, 12D, 16D, 20D, 30D
No. 4 National Nail Sizes 2D, 3D, 4D, 5D
Angel Nail Sizes 10D, 12D, 16D, Roofing

NIBBLER
No. 10-B Gray Turret Head Metal Nibbler, M.D. Capacity 9/16", With Circle Cutting Attachment

PLANERS
32x35"x10' Niles, One Rail Head
42x42"x10' Rockford Hydraulic, Two Head
48x48"x16' Niles, Four Head
48x48"x20' Cincinnati Hypro, Four Head
48x48"x32' Liberty, Four Head
60x60"x21' Cincinnati, Four Head
84x72"x33' Niles-Bement-Pond, Four Head
120x120x48' Pond, Four Head
16x14x36' Mesta, Four Head

PLANERS—OPEN SIDE
36x36"x8' Cleveland
42x42"x10' Cleveland, Three Head
48x48"x10' Rockford Hydraulic, Two Head
60x60"x16' Detrick & Harvey, Three Head

PRESS—EMBOSSING & COINING
250 ton Minster Knuckle Joint Presses (2) 4" & 6" Stroke, 24" x 30" Bed Area

WE OFFER A COMPLETE LIQUIDATION SERVICE ON ANY BASIS WHICH CIRCUMSTANCES INDICATE WOULD BE MOST BENEFICIAL, WHETHER BY AUCTION, PRIVATE LIQUIDATION OR OUTRIGHT SALE

CONSULTANTS IN MANUFACTURING PROBLEMS FOR OVER A QUARTER OF A CENTURY

THERE IS NO SUBSTITUTE FOR EXPERIENCE

CONTACT US IN CONFIDENCE WITHOUT COST OR OBLIGATION

PRESSES—HYDRAULIC
50 ton Williams & White Four Column Hydr. Press, 12" Stroke, 24" Between Columns, Self-Contained with Pump and Elecl. Equipment. New—never used
75 ton HPM Fastraverse Press, 90" Max. Travel, Bed Area 30" x 30"
200 ton Elmes Hydraulic Press, Self-Contained 10" Stroke, 33" Distance Between Columns
325 ton Baldwin Southwark Hydraulic Briquetting Press, 24" Stroke, Size of Briquette 6" x 4"
500 ton Southwark Open Throat Hydraulic Press, 12" Stroke, Platen 56" x 56"
1000 ton Chambersburg 4-Column Hydraulic Press, 18" Stroke, Bed Area 48" x 48"
1000 ton United Steam Hydraulic Forging Press Davey Pat. Quick Acting. Distance between columns 7' x 2'9", Stroke of Ram 48"

PRESSES—HYDRAULIC WHEEL
600 ton Niles—96" Between Parallel Bars
500 ton Niles—48" Between Parallel Bars
600 ton Watson Stillman—108" Between Parallel Bars

PRESSES—STRAIGHT SIDE
Verson All Steel Single Crank Press, 24" Stroke, Bed Area 40" x 40" LATE
No. 620 Bliss High Production Press Flywheel Type 1½" Stroke, Face of Slide 8" x 16½"

PRESSES—TOGGLE DRAWING
No. 14B Bliss Toggle Drawing Press, 53" Between Uprights, 24" Stroke of Blankholder, 28" Stroke of Plunger

PRESSES—TRIMMING
No. 75½ Bliss, 4" Stroke, 24" Bet. Uprights
No. 16 Erie Trimming Press, 6" Stroke, Bed Area 30" x 26"
No. 58 Toledo Trimming Press, 6¾" Stroke, Bed Area 48½" x 26½"

PUMP—HORIZONTAL
4⅞x24" Worthington Horizontal Duplex Pump, Motor-Driven. Capacity 618 G.P.M. at 2000 lbs. Pressure

PUMPS—FIRE
Type CFS Hale Portable Pumping Unit. Capacity 500 Gal. of water per min.
Worthington Fire Pump with 200 H.P. G. E. Motor. Capacity 1500 G.P.M.

PUNCH & SHEAR COMBINATIONS
#91 Size 16 Hercules Universal Ironworker, Capacity Punch 1-1/16" x ⅝", Shear Plate ⅝", Flat 6¼" x ¾", Angle 6 x 6 x ⅝", Round 1⅞, Square 1¾"
No. 4 Hilles & Jones Single End Punch, 48" Throat Capacity Punch 1½" thru 1"
No. 5 Hilles & Jones Single End Punch, 48" Throat Capacity Punch 2" thru 1½"
Long & Allstatter Single End Punch, 60" Throat Capacity Punch 1⅜" thru 1"

RIVETER
150 ton Chambersburg Hydraulic Gap Riveter

RIVET HEATERS
ACF Five Electrode Rivet Heater, Capacity 1"
ACF Four Electrode Rivet Heater, Capacity ¾"
ACF Three Electrode Rivet Heater, Capacity 1"

ROLLING MILLS
9 x 20" Schmitz Single Stand Two High
10 x 12" Standard Single Stand Two High
16 x 32" Bauer Reversible Cold Rolling Mill
18 x 36" Birmingham Single Stand Two High
18 x 60" United Three High
20 x 30" Mesta Single Stand Two High
20 x 36" Farrel Two Stand Two High
20 x 40" Mackintosh Cold Reduction Mill
23 x 60" Mack-Hemp 3-Stand Breakdown Mill
33 x 76" Three Stand Two High Roughing Mill

ROLLS—PLATE STRAIGHTENING
72" Bertsch No. 12 Plate Straightening Roll, Motor Driven. Seven 11⅛" Dia. Rolls. Capacity ⅝" Plate
96" Newbold Plate Straightening Roll 11 Rolls 8" Diameter
72" McKay Plate Straightening Roll, M.D., 11 Rolls 12" Diameter

SAWS
No. 2 Motch & Merriweather Hydraulic Saw, Capacity up to 6" Rounds
26½" Kling Friction Saw, Motor Driven, Hydraulic Feed. Complete with Pump & Motors
48" Kling Friction Saw, Motor Driven, Hydraulic Feed. Complete with pump and motor

SHEARS—ROTARY
No. 8A Quickwork Rotary Shear, 10 Gauge Capacity. Equipped with circle cutting attachment
No. 25A Quickwork Rotary Shear, ¼" Capacity
No. 40A Quickwork Rotary Shear, ⅜" Capacity
No. 60 Quickwork Rotary Shear, ¾" Capacity
No. 100 Kling Rotary Shear, 1" Capacity

SHEARS—SQUARING
6' x 10 Ga. Niagara
10' x 3/16" Niagara
10' x ½" Hilles & Jones, Motor Driven
10' x 9/16" Hilles & Jones, Motor Driven

SLITTERS
36" Yoder G26 Slitter, Capacity 10 cuts 16 Ga., Complete with Uncoiler and Recoiler, M.D.
72" Yoder Gang Slitter, Capacity 5 Cuts 20 Ga.

STRAIGHTENERS
¾" Shuster Straightening & Cut Off Machine 30' Cut Off, Motor Driven
No 1 Sutton, Capacity up to ⅝" Diameter
No. 1½ Sutton, Capacity up to 2" Diameter
No. 2 Sutton, Capacity up to 3½" Diameter
Kane & Roach Rotary Straightening Roll, Capacity ⅜" to ¾" Dia.
Kane & Roach 8-Roll Straightener Rolls grooved for channels 1" x ⅜" x ½" and ⅜" x ⅞" x ⅛"

SWAGING MACHINES
No. 00 Torrington, Capacity 5/16"
No. 3A Standard Capacity ⅝" Solid 1¾" Tube
No. E Langelier, Capacity 1½" Tubing
No. H6 Langelier, Capacity 3" Tubing
No. 306 Etna Swaging Machine Two Die, Motor Drive. Capacity 3" Work Dia., Die Length 6" LATE
No. 6A Standard Rotary Swager, V-Belt Drive. Capacity Tubes 3⅜", Solids 1¼"

TESTING MACHINES
10,000# Southwark Model S-10-B Hydr. Universal, M.D.
100,000# Olsen Universal, Motor Driven
200,000# Riehle Two Screw, Universal Motor Dr.
400,000# Amsler Hydraulic Compression Testing Machine

TRANSFORMERS
1000 KVA Westinghouse 3 ph. 60 cy. 13,200 volts primary, 239 secondary
1500 KVA Pennsylvania 3 ph. 60 cy. 13,200 volts primary, 239 secondary
2000 KVA Pennsylvania 3 ph. 60 cy. 13,200 volts primary, 239-105 secondary
3000 KVA Westinghouse 3 ph. 60 cy. 13,200 volts primary, 239 secondary

TUBE MILL
Butt Weld Tube Mill, Complete with Accessories, Capacity ½" to 3" Tubing

WELDERS
150 KVA Federal Pa-12A Press Type Spot Welder 440 volt single phase 60 cycle
200 KVA Progressive Circular Seam Welder, 440 volt 60 cycle Welding Timer & Idler Knurl Drive
WP-18 P&H Welding Positioner, Motor Driven, Dual Capacity Range 26,000# and 36,000#

WIRE MACHINERY
4-point Bates Barb Wire Machine, 154 barbs per min., 5" barb spacing
2-Point Bates Barb Wire Machine, 236 barbs per min., 4" barb spacing
4-point Emery Barb Wire Machine, 236 barbs per min., 5" barb spacing
20 Draft Superior Wire Drawing Machine, Capacity Wire 18 Ga. to .011" Motor Dr. Spooling Attachment. Wire Pointer, Wire Puller incl. NEW 1946
No. 12 HIC Vaughn Wire Drawing Machine, Motor Drive. Rated 2100 Fpm on 12" blocks with 11 drafts 10 on cover & 1 finish

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QUALITY TOOLS

AUTOMATIC. 1⅞" Conomatic 8 spdl.
AUTOMATIC. 4¾" Conomatic 4 spdl.
BOREMATIC. 47A & 48A Head
BORING MILL. 3", 3¾" & 4½" Lucas
BORING MILL. 100" NBP vertical
BROACH. 10T American dual surface
BROACH. 15T Colonial dual surface
DRILLS. 20", 21" & 24" Cincinnati
DRILL. 45 spdl. W7 Baush multiple
DRILL. Nos. 121, 217, 310, 314A, 315 Baker
DRILL. 6' Dreses radial
DRILL. 6 spdl. Foote Burt No. 2
DRILL. No. 410 Barnes deep hole
GEAR HOBBER. 8H, 12H, 16HS & 18H G. & E.
GEAR HOBBER. 3, 12, A & T Barber Colman
GEAR SHAPER. Nos. 7125A & 6 Fellows
GEAR GENERATOR. 3" Gleason spiral
GRINDER. No. 2 Cincinnati centerless
GRINDER. 4x18, 6x18, 10x18, 10x36, 14x36 Landis
GRINDER. 6"x18", 10"x36" Norton
GRINDER. No. 1 Univ. & 10 Brown & Sharpe
GRINDER. Nos. 228 & 230 Hanchett disc
GRINDER. 16" & 24" Heald 25A surf.
GRINDER. No. 34 Abrasive surface
HONE. No. 307 Barnes
KEYSEATER. Nos. 2 & 4 Mitts Merrill
KEYSEATER. No. 3 Baker
LAPPER. No. 26 Norton Hyprolap
LATHE. 10"x20" Monarch EE
LATHE. 14"x6' & 18"x6' Lodge Shipley
LATHE. 25"x48" & 40"x88" Leblond
LATHE. 36"x16' Bridgeford
LATHE, TURRET. 24" & 36" Bullard
LATHE, TURRET. Nos. 3, 4, 5, 3AL Gisholt
LATHE, TURRET. Nos. 4, 1A & 3A W. & S.
LATHE, TURRET. No. 4 Bardons Oliver
MILLER. No. 3 Cincinnati MSDT
MILLER. No. 2H K. & T. Univ.
MILLER, VERT. Nos. 2M, 2, 3 & 4 Cincinnati
MILLER, VERT. Nos. 2H & 3H K. & T.
MILLER, R. & F. Nos. 08 & 2-18 Cincinnati
MILLER, AUTO. 1H-12", M18, M24 & 12-24 K. & T.
MILLER, AUTO. 1-12, 1-18, 2-18 & 2-24 Cincinnati
MILLER, HYDROMATIC. Nos. 3-24, 3-36, 4-36, 4-48, 34-36, 5-48, 56-72 & 56-90
MILLERS, ROTARY. 36", 42" & 84" Ingersoll
MILLERS, PLANETARY. Type D Hall
MILLER, THREAD. Nos. 4, 6, 40, CT36 Lees Bradner
PLANER. 30"x24"x6' Liberty openside
PLANER. 36"x36"x8' Gray
PRESS. No. 3 Consolidated OBI
PRESS. No. 11 Toledo adj. knee
PRESS. Nos. P1, P2, P3, P4, P5 Ferracute
PRESS. Nos. 202B & 205C Toledo dbl. cr.
PRESS. No. 506 Bliss High Speed
PRESS. Nos. 73½, 75½, 304 Bliss S.S.
PRESS. Nos. 1½ & 1½C Bliss cam draw
PRESS. No. 52 Toledo arch frame
PRESS. 150 ton EG52 Ferracute
PRESS. 1000 ton No. 27K Bliss
PRESS. 600 ton Hamilton forging
PRESS. 100 ton H.P.M. hydraulic
PRESS. 1000 ton Baldwin hydraulic
RIVETERS. 1½B, 3A, 5A High Speed
ROLL. No. 18 Kane & Roach straightening
SHEAR. 72"x14 ga. Wysong & Miles
SHAPER. 24" Columbia Universal
SHAPER. 16", 20", 24" & 28" G. & E.
SHAPER. 20" & 24" Gemco universal
TAPPER. No. 1 Bakewell
TAPPER. Baush radial arm
TAPPER. Nos. 2, 2X & 2BG Garvin
THREADER, BOLT. 1½" Murchey, No. 11
THREADER, PIPE. 2" Landis
UPSETTER. 4" Ajax, 2" National
WELDER. 200 KVA Federal Flash

MILES MACHINERY CO.
BOX 770
SAGINAW, MICHIGAN

CIMCO MACHINE TOOLS AT BARGAIN PRICES

BORING MILLS

Bullard 24" Vertical Turret Lathe
King 34" Vertical Boring Mill
Niles-Bement-Pond 36-44 Vert.
Bullard 42" Vertical
Bullard 42" Spiral Drive, LATE TYPE
Cleveland #1 Horiz. Boring Mill, 2½" bar
Barnes #3 Horiz., 3" bar
P & H type Horiz., 4" bar
Defiance #6, 4½" bar
Heald #44 Boremetic, 3 heads, LATE TYPE

TURRET LATHES

Brown & Sharpe #4
Warner & Swasey #1A, Saddle type, New 1941
Warner & Swasey #2, Ram type, New 1941
Warner & Swasey #2A Univ.
Warner & Swasey #4, Univ.
J & L 2¼" x 24" Hartness Flat turret
Acme 2¼" x 26" Flat turret
J & L 3½ x 32 Flat turret
J & L 3" x 36" Flat turret
Gisholt 21"
Gisholt #4 Simplified Ram type, NEW 1942
Foster #7, Geared Head
Simmons #2B Micro Speed Turret Lathe

MILLING MACHINES

Cincinnati 2-24 Plain Auto. Miller, New 1942
Cincinnati 3-36 Plain Hydromatic Miller
Van Norman #118 Bed Type Production Miller
Van Norman #36, Ram Type Miller, New 1941
Brown & Sharpe #2B Plain Miller, FIRST CLASS
Brown & Sharpe #3B Heavy, Plain Miller, SO
Cincinnati #3 High Power Plain Miller
Cincinnati #3S Universal Miller
Brown & Sharpe #3A Universal Miller
Cincinnati #0-8 Vertical Miller, New 1942
Newton Heavy Duty Vertical Miller, New 1944

GUARANTEED MACHINERY

This Is A Partial List Of Our Stock. Send Us Your Inquiries.

CINCINNATI MACHINERY COMPANY, INCORPORATED
209 E. Second Street
CINCINNATI 2, OHIO

SHEET METAL MACHINERY

WICKES PYRAMID FORMING ROLL	18' ½" Cap.
HILLES JONES PYRAMID ROLL	10' ¼" Cap.
L&N POWER SQUARING SHEAR	10' ¼" Cap.
POWER SQUARE SHEAR, M.D.	42" x 5/16"
NIAGARA SQUARE SHEAR, M.D.	48" x 3/16"
D&K POWER LEAF BRAKE	10' x ¼"
D&K PR. BOX & PAN BRAKE	8' 10Ga. 12" Fing
D&K PR. LEAF BRAKE, M.D.	10' ⅜"
QUICKWORK ROTARY SHEAR	¾" Cap.
RING & CIRCLE SHEAR PEXTO	3/16" Cap.
K&R #17 WRAPPING BENDING ROLL	3/16" 66"
RYERSON SERPENTINE SHEAR, M.D.	½"

MILTON EQUIPMENT CO.
N.E. Cor. 4th & Race Sts. Phila. 6, Penna.

Pels FY-70 Billet or Bar Shear, Cap. 7⅛" rd. M.D. COMPLETELY REBUILT
Cleveland Double Angle Shear, Cap. 8x8x1"; turntable
Buffalo 27-U Ironworker, Punch 1⅜" thru 1"; shear 6x6x¾" angles; throat 30"
3" Ajax Single Stroke Solid Die Ball Header, rated capacity 4½" balls, suspended slides, air clutch
Upsetting & Forg. Machs., National High Duty, guided overarm heading slide, suspended slides, 1½", 2", 3"
Ajax & Acme Upsetting & Forg. Machs., not suspended slides, ¾", 1", 1½", 2½", 3"
W. W. Bulldozers, #1, #2, #3, #4, #5, #8, #4 High Speed
Drop Hammers, 800# to 2500#
Nazel Air Forg. Hammer, #6B, Cap. 7" sq.
Bradley Hammers, Cushioned Helve, Upright & Compact, up to 500#
Trimming Press, #59 ¼ Toledo, 385 ton; other trimmers 55 to 200-ton
Bar Shears, Open & Guillotine, ⅝" to 7" Rd.
Minster 88-ton S.S. Press, 16" stroke
#94-A Toledo S.S. Double Crank Tie Rod Press, bolster 40x36"
Bliss Knuckle Joint Press, 250-ton
Single & Double End Punches, various throat depths and caps.
L. & A. Multiple Punch, 8', 150-ton
L. & A. Multiple Punch, 10', 350-ton
#416-C Niagara Circle & Slitting Shear, ¼"
Bertsch Straightening Roll, 1"x68"
Landis Landmaco 1½", 2-sp. Threader, lead screws, single with Lanco Hds. up to 4"

BOLT, NUT AND RIVET MACHINERY, COLD HEADERS, COLD BOLT TRIMMERS, THREAD ROLLERS, SLOTTERS, HOT HEADERS AND TRIMMERS, COLD AND HOT PUNCH NUT MACHINES, POINTERS, THREADERS WOOD SCREW EQUIPMENT.

Diamond Face Grinder, Segment Wheel 36", Table 84"x24", Hydraulic operated
20x27" American Wheelabrator with dust collector

DONAHUE STEEL PRODUCTS CO.
1913 W. 74th Street, Chicago 36, Ill.

36/90 Cincinnati Hydromatic Duplex Miller
2-BL Natco Multiple Spindle Drill
5" Sellers Floor Type Horizontal Boring Mill
#35 Landis Horizontal Boring Mill, 3½"
9J Gorton Electric Duplicator
6'17" Carlton Radial Drill, motor-on-arm
28/120 Cincinnati Horizontal Hydrotel Miller

HAZARD BROWNELL MACHINE TOOLS, INC.
350 Waterman St., Providence 6, R. I.

NO. 1-18 CINCINNATI PRODUCTION MILLING MACHINE
SERIAL NO 2FIPIK-8 (MFG. 1941)
PRICE $2,500.00
EXCELLENT MECHANICAL CONDITION
WINSTON MACHINERY COMPANY, INC.
517 SOUTH DELAWARE STREET
INDIANAPOLIS 4, INDIANA

AARON FOR RELIABILITY

BORING MILLS
Giddings & Lewis #0, #25T
Lucas #31 horiz.
Universal 3" horiz. equipped
Bullard 24", 36", 42" New Era
42", 72" King Vertical

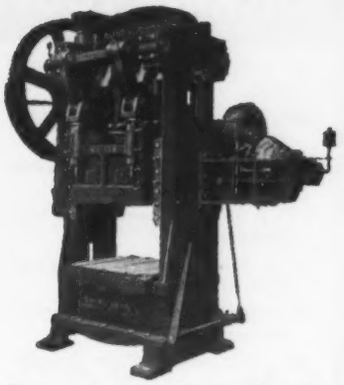
DRILLS AND RADIALS
Barnes #242 #5 Taper
Cinci, Bickford Sup. Ser. 21" Box Col.
Canedy-Otto 3'-9" col.
Carlton 8'-19" col.
Sibley 24" & 28"

ENGRAVERS
Gorton #3U, 2 dimensional
Gorton Cutter Grinders 375-2, 265-6
Deckel GIL, G2

GEAR EQUIPMENT
Gleason 3" Spiral Bevel Generator
Fellows 645Y, #7, #72, #725 High Speed Shapers
Mikron Gear Hobber
Fellows, Michigan, Gleason Checkers

GRINDERS, MISCELLANEOUS
Brown & Sharpe, #5 cyl., 3" x 18", 3" x 12".
Brown & Sharpe #1, #3 Univ. #13 Tool
Cincinnati #2 Centerless
Cincinnati #2 Tool & Cutter
Cinn. 12 x 48" Univ., Gardner #226, 30" disc.
Covel #91A Univ. Tool & Cutter, Hammond #4
Heald 72A3 Int. Centerless Sizematic, #1 Tool
Heald #81 Int. Gagematic, Sizematic
10" x 24" Univ. Latest, #6 Thread
Norton #2 Tool & Cutter, Type C, 6x30"
Oliver #510 Drill Pointer, Sellers 4G, Black D'mond
Pratt & Whitney Radius #R6, K.O. Lee Tool
Porter Cable Belt WG8, G8; Grenby Int.

GRINDERS, SURFACE
Abrasive 8x24", #33, #34 Vert.
Blanchard #16, 30" Mag. Chuck, #11—16" chuck
Blanchard #18—30" Chuck
Brown & Sharpe #2
G. & L. #25, #35 Hyd. Feed 6 x 18, 8 x 24



Bliss 406-48" Dbl. Crank, Dbl. Action Toggle Press

Hanchett 300 series, 13x48" with chuck
Norton 6x18" Hyd., 10x36"
Reid #2A P.F. MIB., #2C Motor Spdl.
Pratt & Whitney 12x36" Vert.
Thompson Hyd. 6x10x18", 6x12x18"

LATHES
Hardinge Precision 9", 1" Collet Cap., Rivett
Hendey 12"x42" G.H., Bradford 14"x6'
LeBlond Regal 15x30", 21x60", 10"x3½', 19x48"
LeBlond Heavy Duty 16x33"
Lodge & Shipley 16x78" T.A., Collets, etc.
Monarch, 10x20" E.E., H., 12x30"
Sebastian 12"x4' G. H.
Sheldon 11"x36", Logan 10"x30"
South Bend 13x36", 14½"x6', 10x4, 9x3, 9x3½
Fay Automatic 12"x81"

MILLS, PLAIN, UNIVERSAL & PROD.
Brown & Sharpe #000, 12, 21, #2A Univ.
Burke #4 Plain & Univ. Vert. Hd.
Cincinnati 2MH Univ. 2-18 Mfg., #2M Plain
Kent Owens #1V; U.S. Hand Mills
Milwaukee 2HL, 2H Univ., 2H Plain
U. S. Multimiller
Sundstrand 00 Rigidmill; Whitney Hand Mills
Van Norman #6, 22L, 36; U. S. 1 & 2 sp.

MILLS, VERTICAL
Brown & Sharpe #2
Cincinnati #4
Fosdick Jig Borer #30, Equipped
Gorton, 8½D Duplicator
Sip Jig Borer #MP-5
Index, Jackson, Vernon
Morey #12M Profiler, 2 sp.

PRESSES
Bliss 650, 645B Hi-Production Presses
Bliss 19, 20, 21 OBI, 58, 62, 62A, 162 OB.
Bliss #4½ Double Action, Roll Feeds

HYDRAULIC EQUIPMENT

Cap.	Manufacturer	Platen	Stroke	Opening
550	Southwark	42x32"	28"	68"
500 Ton	Lake Erie	36x36"	36"	68"
500	D.A. H.P.M. (160 Cushion)	36x36"	24"	30"
50	Dennison	22x20	18	25
150	Southwark	84x30	30	2' to 4'

UP MOVING RAM PRESSES

150 Ton Stokes Molding Presses & Pumps
300 Ton Dunning & Boschert Molding Press
500, 800 Ton Waterbury-Farrel 3 & 4 Rod Presses, 6 & 6½ strokes
300 Ton Watson Stillman Press, 24x20" Platens
500 Ton Shaft Straighteners—Self Contained
All Hydraulic Equipment is completely engineered and checked by a competent staff, thus assuring reliability. Send us your Hydraulic problems.

NEW IN STOCK
Air Hydraulic Presses—Arbor Presses #6C Famco—Band Saws Kalamazoo—Drill Presses all sizes—Hydraulic Press Northern 20 Ton—Injection Molders, 1 ounce—Power Presses, OBI, 4½, 5, 7½, 10, 12, 18, 30 ton—Shaper, 7" Ames, 8" Shaperite—Shaper, Sheldon 12"—Shears, Foot 22" to 8', 16 & 18 ga.—Shears, Power, 3'x18 gauge to 10'x10 ga.—Welders, Arc, Seam, Spot all sizes—Vert. Milling Attach. Haico H.S.—Motors, Grinders, Buffers, all sizes.

Henry & Wright 75 Ton Dieing
Z & H 30 Ton OBI
Toledo 400 Ton Knuckle Joint
V. & O. #102 O.B.I. Reducing

TURRET LATHES
Acme #6W Bar & Chuck, Acme 6W Fox
Bardons & Oliver #3, 1½" cap., #5, 2" cap.
Brown & Sharpe, #1, 2F, Hand
Gisholt #4, Bar & Chuck, 1L, Foster #3B
Hardinge ESM Second Operation
J. & L. #5 Univ. Bar, PRT
Oster #60I Rapiduction, well tooled
Warner & Swasey #4A, 8" cap. Power Chucks (2)

MISCELLANEOUS
Automatic 4 Sp., 1½" Cone
Band Saw; Tannewitz #36M
Band Saw; DoAll 36" Zephyr
Bending Roll; Buffalo #0, ½WR, Excelsior #14
Broach; American Horiz. Hyd. Model H-15-60
Hacksaw; Marvel 6A Automatic #6, 9A
Hardness Tester; Clark
Honer; Micromatic #H-1, Sunnen
Keyseater; Davis, Baker, M & M
Riveters; HI Speed
Saws; Wells, Catskill, Peerless, Kalamazoo
Slotter; P. & W. 6" Vert. Shaper
Shaper; 8" Shaperite, 7" Atlas
Tappers; Bakewell #1, #2; Haskins #2C, 3C
Welders; Seam & Spot; Thompson, Taylor-Winfield, Sciaky

This is but a partial listing. Write for free Catalog. Inquiries invited.

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"CABLE—AARMACH N. Y." Telephone WOrth 4-8233

BENDING ROLL

MODEL NO 60, KANE & ROACH, WRAPPING TYPE, WITH 40 HP MOTOR. MACHINE SERIAL NO. 201784 .....$2,750.00

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INDIANAPOLIS 4, INDIANA

SAWS

#425 Campbell Cutalator Abrasive Saw. 4½" tubes, 3½" solid. AC/MD. 1942.
#401 Campbell Cutamatic Abrasive Cut-off Mach. 6" tubes or solid. AC/MD. 1942.
#SP14 Loma Saw, High Speed Inserted Tooth, for non-ferrous, cap. 4" dia. bars. AC/MD. 1943.

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30 Church St. New York 7, N. Y.

CONTINUOUS ELECTRIC FURNACE 1800 DEGREES 38 KW WITH 3 ZONE CONTROL ALL INSTRUMENTS AND MESH BELT CONVEYOR WITH MOTOR DRIVE. USED ONLY SHORT TIME.

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14 North Harrison St. East Orange, N. J.

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PHILADELPHIA COLD ROLLING MILL

20" x 36", (Extra Rolls 16" x 48", 20" x 42") with Sealed Reduction Drive.

NEWBOLD 3-HI BAR MILL with extra Rolls and 2-Hi Finishing Stand.

4 Continuous Non-Ferrous Rod Benches suitable for Aluminum or Copper.

Swagers and Pointers — All Sizes

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EXCHANGE 15 TONS #30 GAUGE TIN PLATE

black 18½ x 26 for 24—22—20 Hot or Cold rolled sheets.

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EXCELLENT BUYS

No. 3½ BAKER Keyseater, cuts 4" wide keyways, AC factory motor drive.

R14 SENECA FALLS Lathe, automatic timing, front and rear slides, 1941.

84" CONSOLIDATED COLBURN Vertical Boring Mill, 2 swivel heads, AC factory motor drive.

No. 512 NIAGARA Straight Side Press. 285 tons, AC-MD.

10'-⅜" Pyramid Type Bending Rolls.

O'CONNELL MACHINERY COMPANY
1821 Niagara Street Buffalo 7, N. Y.
BEdford 8500

DROP FORGING HAMMERS

2—2000# Erie Steam Drop. New 1942.

1—2000# Erie Board Drop. Model M Serial #5315. Motor Driven Head.

1—1200# Chambersburg. Model J2 Board Drop. New 1945. Motor driven.

3—1200# Late Model F. Chambersburg Board Drop. Motor driven.

2—2000# Billings & Spencer. Board Drop Model D. One located on west coast.

TRIMMING PRESSES

1—#56 Toledo 110 ton, solid frame side shear motor driven.

1—#59 Toledo 350 ton tie rod, Side Shear, motor driven.

UPSETTER

1—3½" Ajax air operated friction clutch, suspended slide. Ser. #3213.

FORGING ROLLS

1—#2 Ajax Serial #3599. Motor driven.

1—#5 Ajax air clutch Serial #3757 No motor.

WILKIE DIE PRODUCTS CO.
1182 Hawthorne Blvd.
Grosse Pointe 30, Michigan
Phone (Detroit) TUxedo 1-7140

LATE TYPE MACHINE TOOLS

12" x 21" Fay Automatic Lathe. 1942.

62" King Vertical Boring Mill. 1942.

No. 645A3, 615A & 61A Fellows Gear Shapers. 1944.

16" & 36" Cincinnati Plain Hyd. Grinder. 1942.

72" Thompson Hyd. Broach Grinder. 1941.

14" x 36" P & W Vertical Surface Grinder. 1942.

20" Cincinnati Plain Shaper. 1940.

No. 3A Lodge & Shipley Duomatic. 1942.

36" & 42" Bullard Vertical Turret Lathes. 1943.

No. 3-36 Cincinnati Duplex Milling Machine.

No. 306 Barnes Vertical Hone. 1942.

150 KVA Federal Seam Welder. 1943.

INDIANAPOLIS MACHINERY & SUPPLY CO.
1983 S. Meridian St.
INDIANAPOLIS 6, IND.

LATE TYPE MACHINERY

BORING MILLS VERT., 42" King, Side Hd., Hi Speed; 36" King, Side Hd., 1943
BORING MACHINES HOR., 5" Sellers, Late, Floor Type; 4" Univ., Table 60" Vert., 90" Hor., 1943; 3½" Landis No. 35 Floor; 3" Yoder Table, 1943; 2½" No. 25T G. & L., Table, 1942; Vert. Attach. for 330T G. & L. Mill.
BORE—Hone, Barnes 10' stroke, '42
CRANE, 30-ton Cyclops, O.E.T., 50' span, 5 ton
RADIALS, 8' & 7' Amer. 19" & 17" columns (2)
DRILL, RADIAL, 6'17" Carlton, Univ. table, 1943
DRILL, RADIAL, 6'17" col. Carlton, motor-on-arm
DRILL, RADIAL, 5'14" col. Amer. Tri. Purp. M.D.
DRILL, 6 Spin. Allen, 15". ±2 M. T., power feeds
GRINDER, SURF., 30"x120" Hanchett Horiz. Spin.
GRINDER, 20" x 72" Landis, Hyd., Cyl., AC. M.D.
GRINDER, 20" x 36", Landis Plain, Cyl., Hyd., late
GRINDER, 10" x 36" Norton, Hyd., Surface, 1943
GRINDER, No. 174 Heald, gap, Int., 54" swing, 1942
GEAR SHAPER, Bevel 11" Reinecker
GEAR CUTTER, 36" No. 3 B. & S., spur, late
GEAR CUTTER, No. 13 B. & S., spur & bevel
LATHE, Roll, United Engrg., M.D.
LATHE, 60" x 45' cen. Mackintosh-Hemphill, 1942
LATHE, 60" x 36' Bed, Pond, Cone M.D.
LATHE, 50" x 20' cen. Amer., 2 carr., T.A., late
LATHE, 50" x 26' cen. Amer., 1 carr., T.A., late
LATHE, 48"-58" x 25' cen. Wickes, 1942
LATHE, 48" x 20' gen. Simmons, hvy., like new, 1942
LATHE, 36" x 32' bed, N.B.P., 2 carr., T.A., M.D.
LATHE, 30" x 20' cen. Axelson, T.A., 34" sw., late
LATHE, 16" x 54" cen., Bradford, T.A., New
LATHE, 14"/17" x 30" cen. L. & S., T. A. '43
LATHE, 12"x30" cen. Pratt Whitney Tool Room, New
TURRET LATHE, No. 2G Morey, Univ., New
MILLER, 36-90 Cinci. Duplex Hydro., 1942
MILLER, No. 3 Cinci., HI Power, Univ.
MILLER, HOR., No. 4B, B. & S., plain, late
MILLER, HOR., No. 36 Van Norman ram, 1943
MILLER, HOR., No. 2 Stand. K. & T. Univ., Timken
MILLER, VERT., No. 4 Kempsmith Maxi-Mill
No. 9J Gorton Elec. Duplicator, '44
MILLER, VERT., No. 3 Cinci. Dial, Late
MILLER, UNIV., No. 2 LU Van Norman, 1942
PLANER-MILLER, 58" x 48" x 18' Ingersoll, 3 hds.
PLANER, 96" x 96" x 24' N.B.P., 4 hds., rev. M.D.
PLANER, FROG & SWITCH, 42" x 18" x 16' N.B.P.
PLANER, OPENSIDE, 36"x54"x18' Cleveland, 3 hds
PLANER, PLATE, 36'x1" Cleveland, M.D.
ROLLS, STRAIGHTENING, 10" x ¾" Pops, 7 Roll
SHAPER, 20" Smith & Mills, Univ., New
SHAPER, 16" Gomco Univ., New
SLOTTER, 20-24" Dill, gear box, M.D.
BENDING ROLLS, 16' x 1½" N.B.P., pinch, 65 ton
BENDING ROLLS, 12' x ½" H. & J. A. C. & M. D.

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30 Church Street, New York 7, N. Y.
PLANT—Clifton, New Jersey
CABLE ADDRESS—Benmachine, New York

FOR SALE
LATE TYPE MACHINES
FOR
IMMEDIATE DELIVERY

Model 300—36" HANCHETT Hydr. Vert. Surface Grinder, table 24"x36", Late.

18"x72" LANDIS Cyl. Grinder, Late.

12"x48" CINCINNATI Univ. Grinder, Late.

5" SELLERS Table Type Horizontal Boring Mill, Late.

No. 25B—3¾" DEFIANCE Table Type Horizontal Boring Mill, Late.

36" BULLARD "Spiral Drive" Vert. Boring Mill, Late.

10" DOUGLAS Slotter, Late.

22" HERCULES Shapers, New.

No. 2 CINCINNATI Univ. Miller, Table 48"x12", M/D.

9'x7'x42' BETTS Double Housing Planer, 4 Heads, M/D.

9'x7'x50' BETTS Double Housing Planer, 4 Heads, M/D.

PARKER MACHINE COMPANY, INC.
158 Pioneer Street, Brooklyn 31, N. Y.

4—Strands, two high, Farrel, 18" x 34" Rolling Mills, with rails, 3 pinion stands, woblers and accessories, lot of spare rolls, manual screwdown; can be shown on original foundations; low price for quick action, and direct shipment from Cleveland district.

1—Crushing Plant, consisting of Williams #2XX Ideal Shreader, Tex Rope drive from 100 HP AC motor; conveyor, magnetic separator, 12" pulleys 20" face, 36" center, 110 volt. One Jeffrey roll crusher, size 30" x 30" with conveyors and motor.

STEWART BOLLING & CO. INC.
3190 East 65th Street — Cleveland 27, Ohio

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OVERHEAD CRANES
IMMEDIATE SHIPMENT

30 TON P & H. 5 Ton Aux. Hoist. Span —49'2". Cab Controlled. 4 Motors—3/60/220 AC. Lift—25 Ft.

15 TON P & H. Span—49'2". Cab Controlled. 3 Motors—3/60/220 AC. Lift—22 Ft.

10 TON P & H. Span—49'2". Cab Controlled. 3 Motors—3/60/220 AC. Lift—22 Ft.

GOOD CONDITION
CAN BE SEEN IN OPERATION

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"ANYTHING containing IRON or STEEL"
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1 #20A WHITING QUICKWORK ROTARY SHEAR. EQUIPPED WITH PNEUMATIC UPPER HEAD CONTROL USED LESS THAN 10 HOURS. PRICE $2400.00.

Barler Metal Products, Inc.
Goshen, Indiana

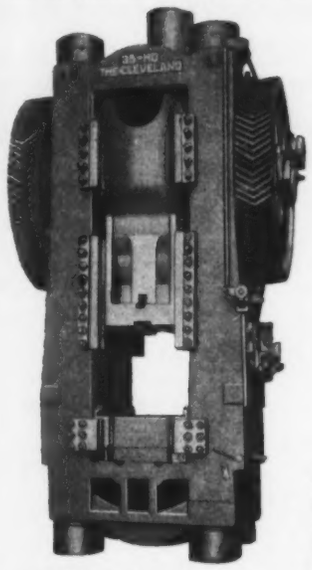
SPOT WELDER

PROGRESSIVE, PRESS TYPE, SERIAL NO X1812, LATE TYPE. 250 KVA, 60 CYCLE, 440 VOLTAGE. COMPLETE WITH WELTRONIC CONTROLS. PRICE $2,250.00

EXCELLENT CONDITION
WINSTON MACHINERY COMPANY, INC.
517 SOUTH DELAWARE STREET
INDIANAPOLIS 4, INDIANA

EMERMAN offers from Stock

No. 35 Cleveland All Steel Forging Press



FOR SALE

Ideal for

Heavy Forging

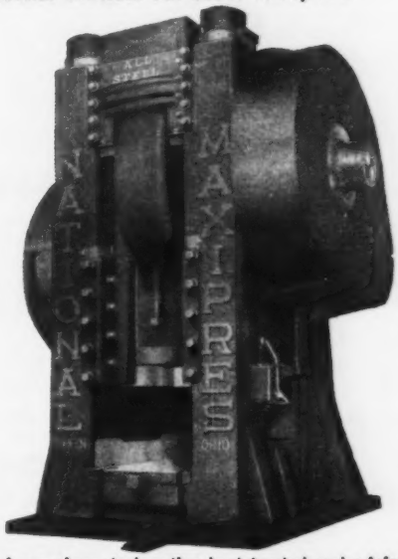
and Coining Operations

OR

FOR RENT

All steel solid construction frame with 4 preshrunk 13½" dia. tie rods. Twin disc friction clutch hydraulically actuated with hydraulic pump and motor. Diameter of crankshaft at bearings 17½", at eccentric pin bearings 30½". Strokes per minute, 30. Stroke of Slide, 12". Distance bed to slide, stroke down, adjustment up 29". Width between uprights, 44". Area of bed, 66" FB x 40" RL. Area of slide, 60" FB x 34" RL. Opening in bed, 5" dia. With Farval automatic lubrication. With air counterbalance to slide. Wedge adjustment of bed, ½". With guided lower die holder. Slide mounted and fitted with bronze wearing strips. Arranged for direct motor drive and complete with 125 H.P., 1200 R.P.M. Reliance motor, type AA, frame 584, 3-60-440 volts with starter.

No. 6 National Vertical All Steel Maxipress



Frame and base of one piece steel casting heat treated and reinforced with 4-13½" dia. tie rods shrunk in place. Area of bed, 52" FB x 40" RL. Hole in bed, 4" dia. Area of slide face, 42" FB x 34" RL. Distance, bed to slide, stroke down, 29". Stroke, 8". Diameter of crankshaft at bearings, 17½"; at eccentric, 29½". All bearings bronze bushed—pinion shaft mounted on roller bearings. Clutch—four abutment type enabling quarter revolution starting controlled by air operated push button. With automatic lubrication to all bearings. Strokes per minute, 25. Arranged for direct connected motor drive with 75 H.P., 900 R.P.M. Westinghouse motor, type GS, frame 754-C, 3-60-440 volts, with starter.

EMERMAN MACHINERY CORP., 865 W. 120th ST., CHICAGO 43, ILLINOIS

TEL.: PULLMAN 5-7626

eastern Rebuilt Machine Tools

THE SIGN OF QUALITY — THE MARK OF DEPENDABILITY

AUTOMATICS
8 spindle 1⅝" Cone, m.d., latest
4 spindle 1¼" Conomatic, m.d., bar, 1942 machine
4 spindle 1½x4" Conomatic, m.d., bar, 1942 machine
No. 6A Potter & Johnston, m.d.
No. 6H Potter & Johnston, m.d.
1-1/16" Type A Cleveland, m.d., latest
14" Fay Flanders Type, m.d.
20x25" Jones & Lamson, m.d., latest
4 spindle 2¼" Cleveland Model "K", m.d.
2¼" Gridley Single Spindle, m.d.
2½" Cleveland Model A, m.d.
4½" Cleveland Model A, m.d.
5½" Cleveland Model A, m.d.
6" Cleveland Model A, m.d.
7¾" Cleveland Model A, m.d.

HORIZONTAL BORING MILLS
No. 0 Giddings & Lewis, m.d., 3½" bar
3½" bar Cincinnati-Gilbert Floor Type, m.d., late type
3½" bar Landis Floor Type, m.d.
4" bar Detrick & Harvey Floor Type, m.d.
No. 45 Giddings & Lewis, m.d., 5" bar
5" bar Barrett, m.d.
5½" bar Niles, m.d.
10" bar Sellers Floor Type, m.d.

VERTICAL BORING MILLS
24" Bullard New Era, m.d., with side head
36" Bullard New Era, m.d., with side head
42" Bullard New Era, m.d., with side head
42" Bullard Spiral Drive, m.d., with side head
42" Colburn H.D., m.d., 2 swivel heads
42" Colburn, m.d., 1 swivel head, 1 turret head, p.r.t.
42" King, belted m.d., 2 swivel heads, p.r.t.
48" Colburn H.D., m.d., 1 turret head, 1 swivel head
48" Putnam H.D., m.d., 2 swivel heads
54" Colburn, m.d., 1 turret head, 1 swivel head
100" Niles Heavy, m.d., 2 swivel heads, p.r.t.
100" Niles Extra Heavy, m.d., p.r.t., late
120" Niles Heavy, m.d., 2 swivel heads, p.r.t.

BROACHING MACHINES
No. 4 Oil Gear Hydraulic, m.d., 64" stroke
75 H.P. LaPointe Hydraulic Horizontal, 150" stroke, 37½ tons cap.
Cincinnati Mill Broach, m.d., 10" spindles, new

BALL BEARING DRILLS
Model D 1100 B Walker-Turner Bench Type, 20" size, brand new
No ½, 1, 2 Avey, belted, m.d.
No. 1B Edlund, m.d., new
No. 2—12" Foote-Burt Single Spindle, m.d.
No. 3 Allen, belted m.d., 12" overhang, No. 3 Taper
No. 3 Type B MA6 Avey, m.d., 12" overhang, latest
No. 4 Fosdick, 8" overhang, belted m.d., No. 2 Taper
No. 5BM-24" Fosdick, m.d., latest
No. 5M-10" Fosdick, m.d.
1 spindle No. 3 Avey Type B, style MA8, m.d., No. 3 Taper, latest
2 spindle Avey, size No. 1, Type B, style VHP, m.d., 8" overhang
2 spindle No. 3 Avey, belted m.d., p.f.
3 spindle No. ½ Avey Heavy, direct m.d., latest
4 spindle No. 2 Avey, belted m.d.
4 spindle No. 2 MA6 Avey High Speed, m.d. on each spindle, No. 2 Taper
4 spindle No. 3 Avey, belted m.d., No. 3 Taper, 12" overhang
6 spindle No. ½ Avey, Model MA8, m.d., latest
6 spindle Leland & Gifford, No. 2 Taper, m.d. on each spindle
6 spindle 2B Edlund, m.d., No. 2 Taper
6 spindle No. 3 Avey belted m.d.
6 spindle Henry & Wright, m.d., 15" overhang, No. 2 Taper

HORIZONTAL DRILLS
Morris Horizontal Multi-Speed, m.d.
No. ½Bx30" Pratt & Whitney 2 spindle Deep Hole Reaming Machine, m.d.
No. ½Bx50" Pratt & Whitney Gun Barrel Rifling Machine, m.d., latest
No. 1Bx74" Pratt & Whitney 2 spindle Deep Hole Reaming Machine, m.d., latest
No. 1½x105" Pratt & Whitney 2 spindle Deep Hole Drill, m.d., latest
No. 1½x105" Pratt & Whitney 2 spindle Gun Barrel Rifling Machine, m.d.
No. 1 Pratt & Whitney 2 spindle Deep Hole Drill, belted m.d.
No. 1½ Pratt & Whitney 2 spindle, m.d., older type
Pratt & Whitney Rifling Machine, belt
5 spindle Detroit Semi-Automatic Drill, belt
2 spindle No. 410 W.F. & John Barnes Deep Hole Drill, m.d.

MULTIPLE SPINDLE DRILLS
No. 3 Baush, m.d., 16x30" head, 15 spindles
No. 3 Baush, m.d., 20x40" head, 15 spindles
P7 Baush Hydraulic, m.d., 20x30" head, 12 spindles, latest
D13H Natco Hydraulic, m.d., 18x12" head, 10 spindles
No. 16 Foote-Burt Center, m.d.
3 spindle 24" Barnes All Geared Self-Oiling, m.d.
3 spindle 12" Rockford Gang, m.d.
4 spindle Foote-Burt Rail, No. 4 Taper, m.d.
4 spindle Niles-Bement-Pond H.D. Rail, m.d., 12' rail, No. 5 Taper

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3'-9" Cincinnati-Bickford, gear box on base
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5' American Triple Geared, 13" col. gear box
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5'-13" Cincinnati-Bickford, m.d.
5'-14" American Triple Purpose, m.d. on arm
5' Cincinnati-Bickford Full Universal, gear box
5' Cincinnati-Bickford Plate Hole Driller, m.d. on arm
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6'-15" American Hole Wizard, m.d. on arm
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6'-15" Cincinnati-Bickford, with 7' arm, m.d.
6'-15" Fosdick, variable speed, m.d. on arm
6' Niles-Bement-Pond Semi-Universal, m.d.
6'-16" Western, m.d.
6'-17" American Triple Purpose, m.d. on base
7'-17" Dreses, gear box, m.d.
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No. 36HO Baker H.D., m.d.
D4 Colburn H.D., m.d.
D8 Colburn H.D., m.d.
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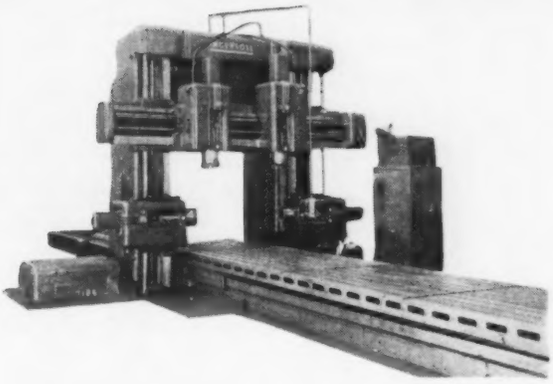

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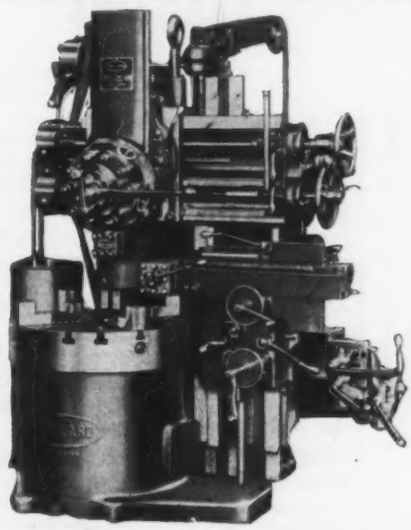

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Qu.	Tons	Make	Span	Current
1	5	P&H	59'7"	440-VAC
1	10	Shaw-Box	40'0"	220-VAC
1	10/3	Whiting	75'0"	230-VDC
1	15	Shaw-Box	53'7"	230-VDC
1	20/5	P&H	75'0"	230-VDC

DIRECT CURRENT MOTORS

Qu.	HP	Make	Type	RPM
4	1500	Whse.	Encl.	600
2***	1250	Whse.	Mill	300/600
6***	800	Whse.	Encl.	600
1	400	Al. Ch.	Mill	400/1200
1***	350	G.E.	MCF4	200/600
1	350	G.E.	CD-169	1150
1	325	Whse.	QM	450/900
1	200/250	El. Dy.	#22	400/1200
1	200	Whse.	Mill	300/1200
1	180	G.E.	MPC	400
1	150	Al. Ch.	Mill	400/1200
2*	150	Cr. Wh.	83-H	890
1	100/125	Rel.	1905-T	300/1200
2	100	Rel.	1050-T	400/1200
1	90/160	G.E.	MPC-6	625/1125
1	75	Whse.	SK-151L	300/1200
1*	50/75	Rel.	1905-F	300/1200
1*	30/75	Whse.	SK-151L	400/1200
1	50	Whse.	SK	300/1200
2	35	G.E.	RF-14	500/1500
1	32½	Whse.	SK-150	400/1200
1	30	Al. Ch.	E-145	400/1200
1	30	G.E.	CDM105	875/1750
2	27½	El. Dy.	15-S	450/1350
1	25	G.E.	RF-13	400/1600
1	25	G.E.	RF-13	400/1200
1	25	Whse.	SK-111L	250/1800
2	20	Al. Ch.	E-130	400/1200

All above are 230-VDC except where marked ***
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3-Phase, 60 Cycle

Qu.	H.P.	Make	Type	Volts	RPM
1	3000	G.E.	MT	2200	356
1**	2000	G.E.	MT-30	2300	240
1**	1500	Al. Ch.	ANY	2200	230
1**	1200	Cr. Wh.		2200	237
2**	1000	Al. Ch.	ANY	2200	235
1	1000	Whse.	CW	2200	444
1**	800	G.E.	MT-12	6600/2200	590
1	700	G.E.	MT-432	2200	400
1**	600	G.E.	MT-412	2200	719
2	500	G.E.	1-16-M	2300	450
1***	400	G.E.	MT-574	550	585
1	400	G.E.	1-E17-M	2300	875
1**	400	G.E.	I-M	2300	590
1**	400	Al. Ch.	ARY	2200	505
2	400	G.E.	MT-412	2200	440
1	300	G.E.	1-E15-M	2200	1200
1	300	Al. Ch.	ARY	2200	505
1	250	Al. Ch.	ARY	440	440
1	250	Whse.	CW-1106	2200	580
1	250	Whse.	C.W.	550	514
1	250	G.E.	MT-414	2200	300
1	150	G.E.	1-E13-M	2200	1750
1***	125	Whse.	C.W.-870	2200	900
1	100	Al. Ch.	ARY	440	1160
1	100	F.M.	420-C	440	900
1	50	Reliance	1750 250		440/220

(4 Units Variable Voltage Set with 5 K.W. Exciter)

1	35	G.E.	1750	125	440/220
1	30	Reliance	1750	250	440/220
2	25	Whse.	1200	120/240	440/220

—Mill type pedestal bearing. *—3-bearing.

MOTOR GENERATOR SETS

Qu.	K.W.	Make	RPM	Volts DC	Volts AC
2	1500	G.E.	600	600	4160/2300
1	1250	Al. Ch.	720	525	4800/2400
1	600	Al. Ch.	900	250	2200
1	600	Al. Ch.	720	525	2200/440
1	500	Al. Ch.	720	525	2200/440
1	400	Whse.	900	250	4600/2300
1	155	G.E.	720	250	2200/440
2	150	C.W.	900	250	2200/440
1	100	Ridgway	1200	275	4000/2200
1	100	Delco	1200	120/240	2200/440
1	75	Whse.	900	75	2200
1	75	Al. Ch.	900	250	2300
1	75	Whse.	1200	125	440/220
1	75	Whse.	1200	250	2200/440
2	75	Star	1200	230	440/220

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1	1750	Whse.		600	550/700
1	1500	Whse.		525	600
2	1000	Whse.		450	600
1	940	Whse.	QM	250	140/170
1	650	G. E.	MPC	250	115/145
1	600	Al. Ch.		250	400/800
1	500	Whse.		230	800/600
1	350	Cr. Wh.	CCM-181H	230	1100
1	325	Whse.	MQ	250	300/900
1	200/300	G. E.	MPC	230	360/920
1	275	Whse.	QM	230	425/850
1	250	G. E.	MPC	230	400/500
1	150	G. E.		600	250/750
1	150	Cr. Wh.	45H	230	1150
10	150	Cr. Wh.	83H-TEFC	230	900
1	150	G. E.	MPC	230	250/450
1	100	Rel.	1050T	230	400/1200
1	100	G. E.	CD-175	230	385/730
1	100/150	Whse.	SK-200	550	600
1	125	El. Dy.	30S	230	750/1500
1	115	Cr. Wh.	JHL	230	1200
1	50/100	G. E.	MPC	230	225/450
3	100	Whse.	SK-184.5	230	475/950
1	100	G. E.	CDP-115	230	1750
2	92	Whse.	SK-173	230	575/1150
1	90	G. E.	CDM-1242-Z	115	1800
1	75	Whse.	SK-133	230	1750
1	75	Whse.	SK-180L	115	850
2	75	G. E.	CDM-1136-Y	230	2000
1	75	Cr. Wh.	CMC-85H	230	500/1500
1	60	El. Dy.	25S	230	525/1050
1	60	Whse.	SK	230	500/1000
1	60	Whse.	SK-130	230	1800
1	50	Cr. Wh.	CCM	230	1750
1	50	El. Dy.	50S	500	194/775
1	50	Cr. Wh.	CMC-80H	230	340/750
1	15/50	Cr. Wh.	CMC-81H	230	300/900
1	50	Whse.	SK-113	230	1750
2	50	G. E.	RCP-31B	230	1750
6	25/30	G. E.	CD-105	230	690/3070

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2	125	G. E.	CO-1832	230	625
2	60	Whse.	Hoist	230	415
2	50	Whse.	Hoist	230	415
4	50	Whse.	Hoist	230	400
2	30	G. E.	MD-104½AA	550	700

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Pamphlets containing information for bidders, forms of bid and contract, specifications, contract drawings, requirements as to surety, etc., can be obtained at the office of the Chief Engineer, Room 1311, at the above address, upon application in person or by mail, by depositing the sum of $5.00 in cash or its equivalent for each pamphlet. Within 30 days following the award of contract or rejection of bids, the full amount of such deposit will be refunded for each pamphlet submitted as a bid and a refund of $4.00 will be made for each other pamphlet returned in acceptable condition. Arrangements will be made whereby prospective bidders desiring blueprints of the contract drawings for their own use may secure same, the cost thereof to be paid by them. For further particulars, apply at the office of the Chief Engineer at the above address.

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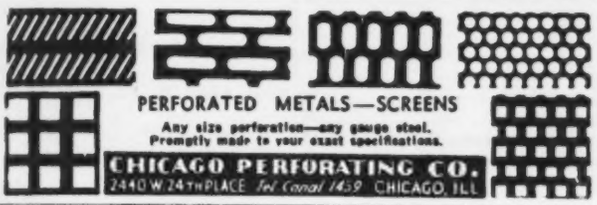

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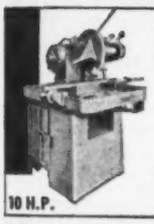

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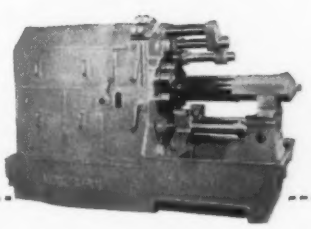

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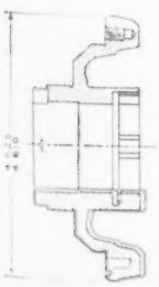

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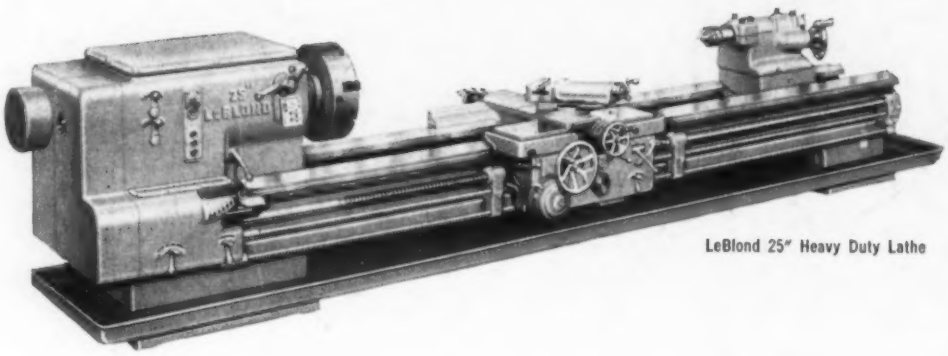

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